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ELECTRICAL CONTRACTING

ENGINEERING • INSTALLATION • REPAIRING • MARKETING

Thousands of Contractors Praise the *New* General Electric Radial Wiring System

Read Some of Their Comments—Learn How You, Too, Can Receive A Valuable Certificate!

A few months ago, the General Electric Company announced to electrical contractors the specifications of the G-E Radial Wiring System, which was designed in order to increase copper and outlet adequacy, and to reduce voltage losses, in residential and apartment buildings.

Contractors throughout the country enthusiastically praised the advantages of this revolutionary new wiring system . . . And then, at the end of last December, General Electric sent to some 15,000 contractors a questionnaire, the purpose of which was to test their knowledge of the features of G-E Radial Wiring. An engraved certificate, stating that the contractor has qualified to install G-E Radial Wiring Systems, was offered to those who satisfactorily answered the 21 questions.

GENERAL ELECTRIC

WIRING MATERIALS

"The Best Move Yet for the Contractor"

The returned questionnaires conclusively demonstrate that the electrical industry has already become familiar with the specifications and benefits of the G-E Radial Wiring System — and that this system seems destined to supplant the conventional wiring system! Writes an Illinois contractor: "Radial Wiring stimulates the use of more electrical equipment and the installation of more wiring. I consider it the best move yet made for the contractor and for the safety of the home owner."

Comments an Indiana contractor: "It will put more money in my pocket by having satisfied customers."

And a Pennsylvania contractor: "One of the biggest steps the industry has ever made."

Get Your Certificate!

If you are not yet familiar with G-E Radial Wiring, you owe it to your business to get complete information. Then you'll prepare to increase your jobs and profits by answering the Radial Wiring questionnaire and thus obtaining the engraved certificate which states you have qualified to make these installations. So *write today,* saying, "Send me complete literature and information on the General Electric Radial Wiring System, including your questionnaire." Address Section CDW-682, General Electric Company, Bridgeport, Connecticut.

Help yourself to more business! *Write now.*

APPLIANCE AND MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONN.

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Why It Will Pay You to Use G-E SWITCHGEAR

FIRST, you can rely on G-E switchgear supplies to give the long, dependable service that your jobs require. For example, G-E control switches for control and instrument transfer have passed endurance tests of 500,000 operations.

Second, these popular supplies are sturdily constructed devices that assure a good, high-quality finished job.

Among them are feeder panels, oil circuit breakers, and disconnecting switches; small air circuit breakers that offer an economical way to eliminate fuse replacement and to maintain your customers' production schedules; improved indicating lamps that cut operating costs; and devices designed to reduce installation time.

And it's a great convenience to have a single source of supply — your local G-E distributor — for every switchgear accessory you need. General Electric, Schenectady, N. Y.

NEW PROFITS IN G-E TIME SWITCHES

The G-E Type T-17 time switch offers you new opportunities for profit. Its increased capacity — 40, 80, and 120 amperes — fits it to handle alone many jobs that formerly required, in addition, contactors. This saving widens the field where you can install controlled show-window, store, and sign lighting. There is a new switch, too, for defrosting refrigerators. Remember that you profiit on the switch itself, on the wiring, fixtures, and accessories.

For complete information, including prices, on the G-E general-purpose time switches, see Bulletin GEA-1427.

OFFER VC LINE WIRE

You'll find a lot of customers who will like this VC line wire. Offer it for the same applications as ordinary braided weatherproof wire. It costs but little more and has many advantages:

It reduces the possibility of high voltage being impressed on house services when primary lines fall on secondary distribution lines.

Lessens the possibility of grounds when a line comes in contact with trees, poles, or houses.

Makes the line safer for linemen and for the public.

For detailed information see Bulletin GEA-2103.

870-3

GENERAL ELECTRIC

S. B. WILLIAMS
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Manager

ELECTRICAL CONTRACTING

With which is consolidated
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INSTALLATION
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MAINTENANCE
REPAIRING
MANAGEMENT
MARKETING

for

ELECTRICAL CONTRACTORS
INDUSTRIAL
COMMERCIAL
RESIDENTIAL

ELECTRICAL INSPECTORS
ENGINEERS
SERVICE SHOPS

and others engaged in the business of electrical construction

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12 PATHS TO SERVICE !

FROM POWERHOUSE TO HOME ...

and to every electrical job in the home

WIRE DEPARTMENT
UNITED STATES RUBBER PRODUCTS, INC.
1790 BROADWAY NEW YORK, N. Y.

UNITED STATES RUBBER COMPANY · US · TRADE MARK

United States Rubber Company

EC
FEBRUARY 1936

Advertising

THERE are a few general magazines that are able to make a profit without carrying any advertising. Business and trade papers like ELECTRICAL CONTRACTING, however, could never be published with anything like the present editorial service without the revenue from advertising. The actual cost of serving our readers exclusive of all advertising costs last year was approximately three times what was received from our subscribers.

ADVERTISING, in other words, makes it possible for us to offer ELECTRICAL CONTRACTING at a subscription price sufficiently small to be afforded by every member of the industry. Without advertising, the subscription price would have to be put at a figure that only a small number of contractors would feel was not prohibitive.

THERE is another side to advertising in business and trade papers which subscribers sometimes fail to consider, and that is the way in which it helps readers. Unlike general magazines which are purchased for amusement, trade papers are purchased because they are helpful in conducting one's business. While the business of electrical construction is that of making installations, it is essential that the right products and the best tools be used. From this angle the advertising pages are equally as important as the text pages. The announcements of the advertisers bring new ideas, new methods, new economies to our readers.

THE advertisements in ELECTRICAL CONTRACTING are also time savers for our readers. Without them, if one wanted to keep up with developments, he would have to give up a lot of time to the careful reading of all the miscellaneous advertising matter that comes in the mail. The simpler all-in-one-package trade paper method of presenting the month's advertising messages is therefore worth many times the subscription price in the time it saves.

AND finally, advertisements in ELECTRICAL CONTRACTING represent dependable products. Advertisements in trade papers are there to be seen by everybody and for that reason, if for no other, they must be true. The publisher also exercises considerable control over what advertising is permitted. In these ways are our readers protected.

THE publishers of ELECTRICAL CONTRACTING therefore urge the readers to take full advantage of the advertising pages. Look upon the advertising pages as a service that will save you time and money and materially help you in your business.

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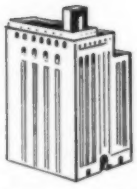
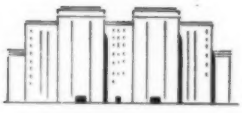
Jobs are there for alert electrical contractors

PUBLIC BUILDINGS



HOUSING PROJECT

SCHOOLS



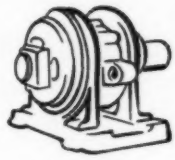
HOSPITALS

THE construction industry is coming back to life. For the first time in years, sizeable funds are being made available for construction projects large and small, public and private. These projects mean more and more jobs for electrical contractors if they go out after these jobs.

The contractor's opportunities will be varied in scope. It may be a simple remodelling job. Or it may be a large scale public building project.

Naturally, electrical equipment will be needed. Quickly and economically. The contractor must have a dependable source of supply, geared to his needs.

Graybar fulfills this need. It brings to electrical contractors an experienced service of supply equal to any requirement and including anything and everything electrical. It brings, too, a **67** year old reputation for dependable materials—a reputation that will back up the reliable contractor's own good reputation.



MOTORS

LIGHTING FIXTURES

SIGNALLING

WIRE AND CONDUIT

GraybaR

ELECTRIC COMPANY

OFFICES IN 77 PRINCIPAL CITIES. EXECUTIVE OFFICES, GRAYBAR BUILDING, NEW YORK, N. Y

ELECTRICAL CONTRACTING

Vol. 35 FEBRUARY, 1936 No. 4

▲

S. B. Williams, Editor

▼

FIELD BRIEFS

● NEARLY THREE TIMES as many farms were electrified in 1935 as in 1934, according to a statement from REA, and a new peak was anticipated for this year. The total number of farms now having central station service is 827,000 or slightly more than 12 per cent of all the farms in the country.

● THE HARTFORD, Conn., range program provided 2,874 installations in 1935 which averaged about $40.00 per job. In addition there were over 500 electric water heaters installed at an average wiring cost of $18.00 each. The Hartford Electric Light Company, which sponsored this program sells no merchandise. About fifty contractors participated in this wiring, many of whom also engaged in direct range sales.

● MORE THAN SEVENTY-FIVE electrical workers, helpers and inspectors enrolled for the safety course sponsored by the Green Bay (Wis.) Electrical League, City Inspection Bureau and the Vocational School. The course consists of five sessions covering care of minor burns and injuries, resuscitation, employer and employee responsibility under workman's compensation, responsibility of workmen to the public and fire hazards.

● FOLLOWING ITS 1935 publicity campaign on approved cords, the electrical inspection department of Kansas City, Mo., is this year sending a letter and folder to 550 local dealers on the desirability of selling to the public "approved" fuses of 15 amp. capacity.

● THERE IS A TREND among a group of Westchester County (N. Y.) electrical contractors to discourage the purchase of flexible cords and accessories for outlet extensions at their retail counters. This policy removes the stigma of dangerous wiring from the contractor, and in many cases causes the customer to have approved outlets installed at around $4.50 each, whereas the counter sale would otherwise have only amounted to some cheap materials.

● AN INDICATION of recovery in building construction comes from Hartford, Conn., where the electrical department with 3,507 permits at a total valuation of $332,683 set a new mark in number of permits issued.

● BECAUSE OF LABOR SABOTAGE, a Long Island, N. Y., builder of houses on a large scale has limited wiring to the barest minimum on the theory that the less there is of it, the less there is to damage.

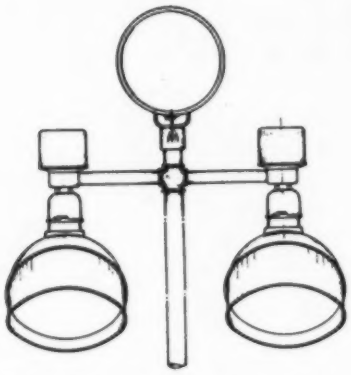
● DENVER'S 1935 Christmas Outdoor Lighting activity developed an unprecedented amount of business for electrical contractors. Formerly, when the observance was staged as a "contest," there were comparatively few entries. During the recent Yule season, a certificate, signed by the mayor, was presented to all citizens who participated with exterior lighting of their homes and electric illumination of premises, making the event a civic matter. Nearly 2,000 of the certificates, in addition to major prizes, were awarded.

Practical Factors in

MERCURY LIGHTING *for* SERVICE STATIONS

by A. B. McKenna

Commercial Engineering Department, Westinghouse Lamp Company.



Pole top mounting for two 400-watt high intensity mercury vapor lamps in AFA-16 floodlights with transformers mounted above each projector. At center above is one A-14, 500-watt Mazda floodlight.

THE entrance of high intensity mercury lamps into the field of outdoor lighting presents an attractive market for new business in the illumination of service stations. So far, a dearth of such installations somewhat limits the knowledge of this particular field, but actual experience dictates certain practice worth following. Electrical contractors contemplating this market should know something of the methods already evolved if they would avoid any difficulties which may arise.

First of all, mercury lighting for service stations is not limited to new buildings. The bulk of the business lies in modernization jobs—the replacement of or the combination with existing installations.

The initial asset of mercury lighting is the added punch it gives to the night-time appearance of buildings and grounds. This alone justifies its use, because motorists see the location quicker and fix it more firmly in their minds. The distinctive color of mercury light is also a factor in its ability to attract the eye. Essentially, it consists of yellow, green, and blue and is deficient in red and orange. This peculiarity offers a distinct advantage where black, white, yellow, green and blue colors are involved. On the other hand, where red or orange form a part of the color scheme, the high intensity mercury vapor lamp should be supplemented with the light from Mazda lamps.

The 400-watt high intensity mercury vapor lamp because of an unusually high efficiency produces higher light intensities with no increase in wattage.

This is a distinct economy in that the customer can without spending any more money for electricity secure a large increase in the amount of illumination. Mercury lamps will produce about twice the intensity for the same wattage. It is this advantage plus that of distinctive color which combine to overrule any objection of installation costs. In the long run, achieving brighter illumination brings in more business and soon writes off the cost of new equipment.

The Color Factor

As previously stated the predominating colors of blue, green, and yellow in the light of high intensity mercury lamps are a determining factor in the ultimate lighting effect on the exterior of a station building. Since the light is deficient in red and orange, objects of these colors do not appear in their true color.

Color schemes involving blues, greens, yellows, whites, and blacks utilize fully the startling effect of mercury light. These colors are

Red and white gasoline service station lighted by four high intensity mercury vapor lamps in open floodlights combined with two 500-watt Mazda lamps in similar floodlights to bring out the red on the pump island and on the building.

High intensity mercury floodlighting of service station in East Orange, N. J., strikes a new note in outdoor lighting. A total of nine 400-watt mercury vapor lamps and five 500-watt Mazda lamps in floodlight projectors are used.

recommended for the station where there are no restrictions on decorative motif, as the independent dealer type. Here the colors may be selected to produce the most startling effect.

Inasmuch as most stations today are operated by large oil companies which have definite color schemes associated with their trademarks, the contractor, or lighting engineer, must be prepared to produce an illumination job which will bring out the various colors involved in their true appearance. When these color schemes do not include red or orange the problem is simplified because the light from mercury lamps alone will produce satisfactory results. However, red and orange, when they form a part of the color scheme, make it necessary to utilize the light of Mazda lamps in order to give these colors a normal appearance.

Situations may be encountered wherein the color schemes of the station buildings are satisfactory for mercury lighting alone but where some objection may arise because of the peculiar color of the face and hands of the station attendants. This situation may also be taken care of by using some Mazda lighting just as though red or orange were involved in the decorative color scheme. When it is found necessary to combine the light of Mazda and mercury lamps, one 500-watt incandescent lamp in a suitable projector and two 400-watt high intensity mercury lamps in suitable projectors will produce the best results. It might be well to bear in mind that, of the total wattage consumed in such a combination, 36 per cent is directly attributed to the 500-watt Mazda lamp.

Using Existing Equipment

Existing installations will often permit the addition of mercury vapor lighting with little change. Mercury lighting of proper proportion in wattage with respect to existing wattage will merely be added, even using the same poles for support of the new units. In this way, the mercury lamps supply the bulk of illumination, while the incandescent sources are primarily for color correction. The majority of stations are now underlighted, so that the addition of mercury lighting is really stepping up the illumination to an effective level, plus the color effect to bolster attraction value.

In many Mazda lighting installations where the closed type of floodlight is used exclusively, it will not be possible to use high intensity mercury lamps in these fixtures. However, where open type equipment is in use, mercury lamps may be used satisfactorily, provided the position of the socket is changed to bring the light center to the proper position. There are certain types and designs of reflectors that are especially suited for the 400-watt high intensity mercury lamp and their use is strongly recommended. In order that the arc stream may be maintained in the center of the tube, the lamp must be operated in a vertical position. A deviation greater than 10 deg. from the vertical will cause the arc stream to bow until it touches the wall of the tube, soon melting it and destroying the lamp.

Installation Factors

A mounting height of 30 ft. is recommended, although in case of necessity a mounting height of 25 ft. will provide satisfactory illumination. Mercury floodlighting for gasoline service stations is computed by the same methods now used for incandescent lighting.

The location of the poles is governed by a number of factors such as the size of the area to be illuminated, the location of the building in that area, and the level of illumination desired. Frequently the location of existing poles cannot be changed because of adjoining buildings or other attendant restrictions. In such cases

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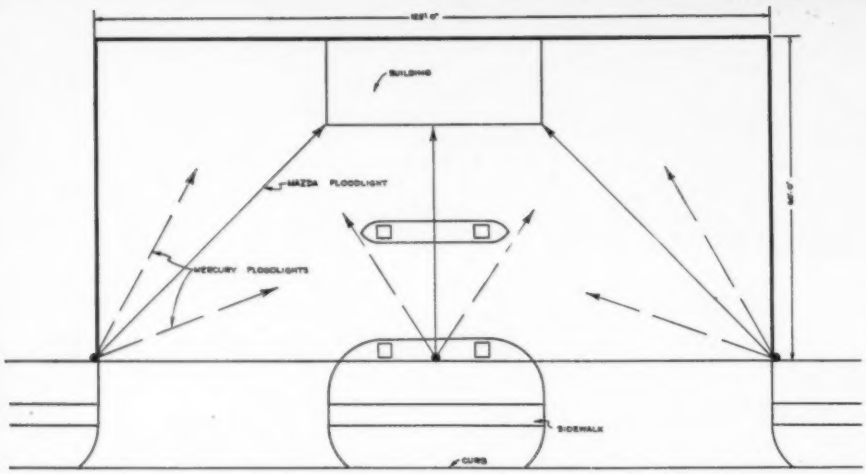


Typical layout for middle of block location

one can only install the mercury lamps on existing poles.

If mixed illumination is to be used, it is recommended that floodlighting projectors be used for the Mazda lighting which will give a long throw so that this light can be concentrated on the station building. Then the addition of high intensity mercury lamps to the pole top will provide adequate floodlight illumination. Naturally, if the poles are improperly located and cannot be changed the resultant illumination will not be efficiently distributed.

In focusing the lighting equipment at the completion of a job, adjust the Mazda lamps first with the mercury lighting extinguished. The projectors should be so adjusted that the main beam strikes the building or any section where it is desirous of bringing out a full red or orange color. Following this, extinguish the Mazda lighting and adjust the mercury lamp projectors so as to distribute light as uniformly as possible over the entire ground area. Where wide angle projectors are used this method of adjustment will assure good coverage with some of the high intensity mercury vapor light striking the building, there to blend with Mazda lighting to produce an excellent white light effect.

Current limiting devices, an accepted reactor for 208-240-volt service, or an accepted transformer for the regular 105-125-volt service, may be mounted in one of three places. They may be mounted atop the pole adjacent to the reflector, or in the base of the pole if such space is available, or in the station building on the panel board. When installed in the building no weatherproof boxes are required but, on the other hand, additional wiring is required between transformers and floodlights.

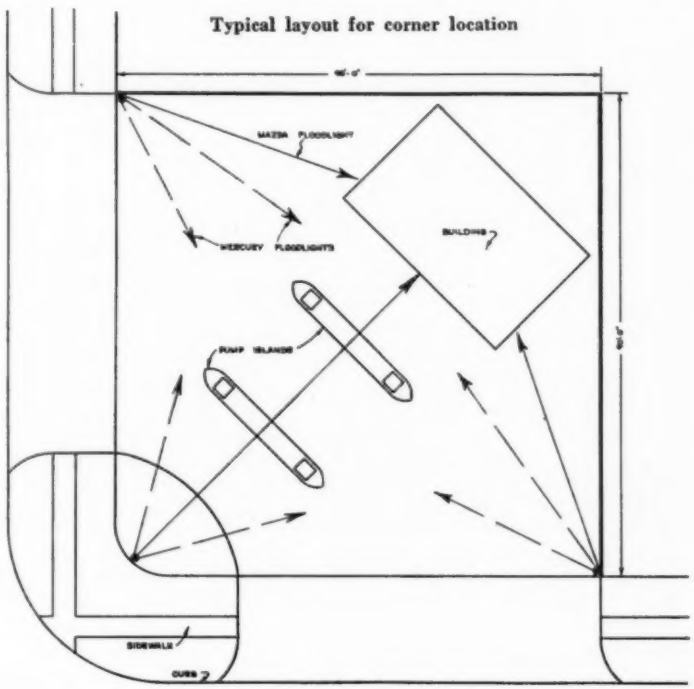
Wiring Problems

Proper wiring for mercury lighting installations is of extreme importance because voltage variations may seriously affect the operation of the lamps and thus impair the satisfactory performance of the entire installation. Nothing smaller than No. 12 wire should be used for mercury lighting circuits, as otherwise the voltage drop in a line may be so large as to prevent the mercury arc reaching its maximum temperature where it produces highest light output. For a period of about two minutes after the mercury arc is established, the lamp requires approximately 20 volts, 5 amp. At this stage the arc tube is filled with a blue glow of low intensity. After a few minutes the normal operating condition is reached, and the lamp then requires approximately 155 volts, 2.8 amp. Now the glow that filled the entire arc tube at the outset is concentrated into a narrow, pencil-light arc stream of great brilliance. During the period over which the lamp is approaching its normal operating condition, the amount of light produced increases rapidly until stabilization is reached when the light output is approximately 16,000 lumens.

All operating equipment in the station building or on the grounds, such as air compressors and elevating greasing platforms, may produce a sudden voltage drop which will cause the lamp to go out. Therefore, in order to assure satisfactory illumination, all lighting should be wired on separate circuits.

Service station owners who have tried this new light now have an enthusiasm which augers well for a lighting business boom in this field. Installations now in operation show a definite sales benefit which may well be from higher levels of illumination as well as from the color of mercury lighting. Several stations now illuminated with mercury lighting report a marked increase in sales which managers attribute directly to the greater business attracted by the lighting.

Typical layout for corner location



House Wiring Facts

by S. B. Williams
Editor, ELECTRICAL CONTRACTING

HUNDREDS of millions of dollars were spent last year for home modernization, but very little of it found its way into improved wiring. Why?

Thousands of new homes are now being built each week, but for the most part only the minimum of wiring is being installed. Why?

The answer that has always been given is that the small electrical contractor is not a salesman. That, however, is the answer of one who is unwilling to look the facts squarely in the face.

What are the facts?

*

The public does not want any more wiring.

The famous J. Walter Thompson survey of five thousand homes, conducted a few years back for the Industry Sales Conference, brought out the fact that 70 per cent of the public did not want any more wiring. The Electrical Board of Trade of St. Louis attempted to give away a convenience outlet with the sale of an appliance, but the public did not want the outlet. Other leagues have had similar experiences. Builders say that the reason they do not spend more for wiring is because the public does not pay any attention to the wiring, or make any requests for more wiring.

*

The builders and architects refuse to sell wiring.

ELECTRICAL CONTRACTING'S field staff has recently been calling upon a number of residential builders and architects to learn why more adequate wiring was not going into the new homes. They answered frankly that they did not intend to do the selling for the electrical people. When the electrical industry had created a demand for more adequate wiring to the degree that it would become a selling point in new homes, then, and not until then, would builders and architects attempt to put more wiring into homes. The architects and builders called upon were responsible last year for many thousands of new homes, and they were almost unanimous in stating that they supplied only the minimum of wiring.

In the Cleveland area, where winter air conditioning is being strenuously pushed, it was found that homes installing air conditioning have less wiring than those that did not install air conditioning. At whose expense, then, was the air conditioning done?

*

The condition now existing in the wiring of new homes is worse than ever.

Ten years ago 2 per cent was considered to be a fair allowance for the wiring of a new home. Recent surveys made by the field staff of ELECTRICAL CONTRACTING show that from three quarters of one per cent to 1¼ per cent is now a fair average. Thousands of six-room homes are being wired today for less than $50.00.

*

The wiring conditions in old buildings is becoming worse.

There are now 21,000,000 wired homes in the country, less than one half of one per cent of which are adequately wired. A survey made by ELECTRICAL CONTRACTING in 1930 showed that six out of every ten buildings in the United States had some defective wiring, the replacement cost of which would be an average of $59.00 per building. Another survey made by this magazine a year ago, showed the extent to which cord wiring is being used in homes, as well as the extent to which obsolete and inefficient wiring devices are still in service. The survey further indicated the insufficiency of convenience outlets, and the almost total lack in most rooms of switches.

*

The possibilities in new business are enormous.

Estimates made by ELECTRICAL CONTRACTING last spring, based upon a field study, showed that if only 1 per cent of the existing homes were rewired to the industry's standards of adequacy each year, we would need 22,220 wiremen employed fifty weeks of the year to do this work. If only a partially adequate job of say $100.00 of rewiring were done per home, it would mean a total market of nearly four times the largest volume of business enjoyed by the electrical contracting industry in any one year. If only 10 per cent of that were done, it would probably double the present volume of electrical construction.

If only 10 per cent of the homes to be built in 1936 were adequately wired, there would be an increase in the sale of No. 10 wire alone of approximately 54,000,000 ft. Other wiring material sales would be increased in like proportion.

*

No other important industry expects its retailers to create demand

The automobile industry not only creates public demand, but teaches its dealers how to sell. The food and drink manufacturers create a public demand before they expect storekeepers to move their products. Brass piping was not sold by the plumber until after the manufacturers had created public acceptance. The paint manufacturers found they had to create a public desire before the painting contractors could sell. There is probably no other major industry in this country which leaves its selling so largely in the hands of contractors, giving them so little constructive help.

*

The industry does not know how to sell residential wiring.

Since there is no question in the minds of the industry as to the value of adequate wiring; or what constitutes adequate wiring, a national standard having been developed; or the increase in the business to be expected from adequate wiring; or its effectiveness in making the sale of appliances easier; or its effect upon increasing the sale of energy; and since our share in new house dollar for wiring is getting smaller, then the fact that stands out is that *we do not know how to sell residential wiring.*

UMI

An Easy-To-Keep Business Record

By Laurence W. Davis
General Manager
National Electrical Contractors Association

THERE has been a very great need for a simple yet practical system of accounting for small and medium sized electrical contractor and dealer businesses which can be maintained with a minimum amount of entries and without the complexities of accounting methods designed for larger businesses. The Simplified Business Record for Electrical Contractors has been designed by the National Electrical Contractors Association to meet this need.

It is so designed that all of the entries are made in the columns of a double page spread of a single book, requiring only the addition of a separate ledger for Accounts Receivable and Accounts Payable which may be obtained from any stationery store. Job records covering the payrolls, materials and direct job expenses, should be kept together in some form of job envelope until the job is completed and billed to the customer. There should also be adopted some simple form of Charge Sales Ticket and Cash Sales Ticket for merchandise and store sales, and provision should be made for entering the cost on each merchandise sale.

The pages of the system provide for 48 kinds of entries on each page as the system lies open for use. All transactions relating to general expense items and purchases are entered on the left-hand page and all transactions relating to the cash record and to merchandise and job sales on the right-hand page.

The Simplified Business Record is a "double entry" system with all of the laboriousness, cross entries and complications eliminated.

Each transaction, whether an expense item, a purchase or a sale, is written into the record but once, but the amount of that transaction is entered in its proper place in two columns—one entry of the amount recording in the proper column the value of the goods or services purchased or sold and the same figure entered in another column under the proper heading of either Cash Paid Out or Cash Received or under Bills Payable or Accounts Receivable if it is not a cash transaction.

All purchases made on any date, either for cash or on credit, should be entered on the date made, provided the merchandise or service therefore has been received, and all sales of merchandise or services should also be entered on the date that either the merchandise is delivered to the customer or a job is completed or is ready for billing. In the case of store sales for cash the total of these cash sales for a single day may be entered as one item in the system but a method should be adopted by which the total cost of the merchandise sold may also be entered after the total selling price, as this figure is needed not

SIMPLIFIED BUSINESS RECORD

GENERAL EXPENSE A

OVERHEAD EXPENSES — COST OF DOING BUSINESS

MANAGEMENT & OFFICE SALARIES, COMMISSIONS & ALL WAGES NOT CHARGED DIRECTLY TO SPECIFIC JOBS 1	RENT LIGHT HEAT AND POWER 2	STATIONERY OFFICE SUPPLIES POSTAGE TELEPHONE & TELEGRAPH 3	TRAVELING ENTERTAINING ASS'N DUES ADVERTISING DONATIONS MISCELLANEOUS 4	LICENSES, TAXES (INCL. SOCIAL SECURITY & SALES TAXES) COMPENSATION & OTHER INSURANCE INTEREST PAID 5	TOOLS REPAIRS AND MAINTENANCE — LOSSES AND DEPRECIATION ON MERCHANDISE & EQUIPMENT & BAD ACCTS. 6	AUTOMOBILE REPAIRS TIRES OIL, GAS ETC. 7	CREDITS AND REFUNDS RECEIVED ON EXPENSE ITEMS 8	DATE 9	TRANSACTION 10
									AMOUNTS BROUGHT FORWARD

CASH RECORD

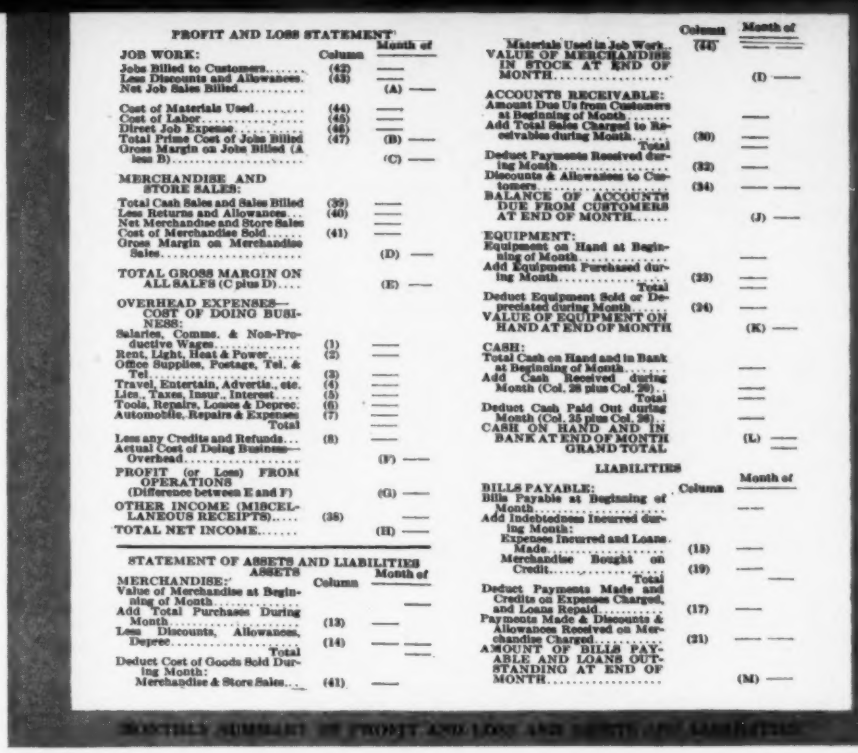
CASH PAID OUT			CASH RECEIVED		ACCOUNTS RECEIVABLE						DATE	TRANSACTION
CASH	BANK		BANK	CASH								
PAID FROM CASH DRAWER 25	PAID BY CHECK FROM BANK ACCOUNT 26	CHECK NUMBER 27	DEPOSITED IN BANK ACCOUNT 28	CASH PUT INTO CASH DRAWER 29	SALES CHARGED TO ACCOUNTS RECEIVABLE 30	POSTED IN LEDGER 31	PAYMENTS RECEIVED ON ACCOUNTS RECEIVABLE 32	POSTED IN LEDGER 33	DISCOUNTS AND ALLOWANCES TO CUSTOMER 34	POSTED IN LEDGER 35	36	37
												AMOUNTS BROUGHT FORWARD

UMI

alone to show the profit on the sales but also as the basis for determining the inventory value of the merchandise remaining in stock.

The Business Record System is so designed that at the close of each month the footings of all columns may be transferred to a Monthly Summary which is made a part of the system, to provide a Profit and Loss Statement that will give to the owner of the business accurate knowledge of the gross margin on his sales, the total cost of doing business and his actual profit or loss from operations and income from other sources. This monthly summary of business operations is the important function of all accounting and has heretofore only been available with elaborate methods.

Other features equally important to the business man are also provided. For example, under the Social Security and State Unemployment Insurance Acts it is necessary that employers not only set aside a reserve for payment of taxes on their total payrolls but also that they collect from the employee in many cases a percentage of the wages and hold these in reserve to be paid at the end of the tax period. Each payroll is entered as a transaction on the left-hand page of the Business Record System and if it is a payroll for productive labor the total amount of the wages are entered as a single figure in the column headed "Productive Labor Payrolls." If the state laws require the withholding of 1% of this payroll then the actual cash amount for the 99% paid to the employees is entered under "Cash Paid Out," and the 1% withheld from the wages is entered in the general classification under "Bills Payable" in the column headed "Expense Incurred and Not Paid For," and this amount is posted in the Bills Payable Ledger to an ac-



PROFIT AND LOSS STATEMENT

JOB WORK:	Column	Month of
Jobs Billed to Customers	(42)	
Less Discounts and Allowances	(43)	
Net Job Sales Billed		(A)
Cost of Materials Used	(44)	
Cost of Labor	(45)	
Direct Job Expense	(46)	
Total Prime Cost of Jobs Billed	(47)	(B)
Gross Margin on Jobs Billed (A less B)		(C)
MERCHANDISE AND STORE SALES:		
Total Cash Sales and Sales Billed	(39)	
Less Returns and Allowances	(40)	
Net Merchandise and Store Sales		
Cost of Merchandise Sold	(41)	
Gross Margin on Merchandise Sales		(D)
TOTAL GROSS MARGIN ON ALL SALES (C plus D)		(E)
OVERHEAD EXPENSES—COST OF DOING BUSINESS:		
Salaries, Comms. & Non-Productive Wages	(1)	
Rent, Light, Heat & Power	(2)	
Office Supplies, Postage, Tel. & Tel.	(3)	
Travel, Entertain, Advertis., etc.	(4)	
Lics., Taxes, Insur., Interest	(5)	
Tools, Repairs, Losses & Deprec.	(6)	
Automobile, Repairs & Expenses	(7)	
Total		
Less any Credits and Refunds	(8)	
Actual Cost of Doing Business—Overhead		(F)
PROFIT (or Loss) FROM OPERATIONS (Difference between E and F)		(G)
OTHER INCOME (MISCELLANEOUS RECEIPTS)	(38)	
TOTAL NET INCOME		(H)

STATEMENT OF ASSETS AND LIABILITIES

ASSETS	Column	Month of
MERCHANDISE:		
Value of Merchandise at Beginning of Month		
Add Total Purchases During Month	(13)	
Less Discounts, Allowances, Depree.	(14)	
Total		
Deduct Cost of Goods Sold During Month: Merchandise & Store Sales	(41)	
Materials Used in Job Work	(44)	
VALUE OF MERCHANDISE IN STOCK AT END OF MONTH		(I)
ACCOUNTS RECEIVABLE:		
Amount Due Us from Customers at Beginning of Month		
Add Total Sales Charged to Receivables during Month	(30)	
Total		
Deduct Payments Received during Month	(32)	
Discounts & Allowances to Customers	(34)	
BALANCE OF ACCOUNTS DUE FROM CUSTOMERS AT END OF MONTH		(J)
EQUIPMENT:		
Equipment on Hand at Beginning of Month		
Add Equipment Purchased during Month	(33)	
Total		
Deduct Equipment Sold or Depreciated during Month	(34)	
VALUE OF EQUIPMENT ON HAND AT END OF MONTH		(K)
CASH:		
Total Cash on Hand and in Bank at Beginning of Month		
Add Cash Received during Month (Col. 28 plus Col. 29)		
Total		
Deduct Cash Paid Out during Month (Col. 25 plus Col. 28)		
CASH ON HAND AND IN BANK AT END OF MONTH GRAND TOTAL		(L)

LIABILITIES	Column	Month of
BILLS PAYABLE:		
Bills Payable at Beginning of Month		
Add Indebtedness Incurred during Month:		
Expenses Incurred and Loans Made	(15)	
Merchandise Bought on Credit	(19)	
Total		
Deduct Payments Made and Credits on Expenses Charged, and Loans Repaid	(17)	
Payments Made & Discounts & Allowances Received on Merchandise Charged	(21)	
AMOUNT OF BILLS PAYABLE AND LOANS OUTSTANDING AT END OF MONTH		(M)

FOR ELECTRICAL CONTRACTORS

ND PURCHASE RECORD

PURCHASES FOR RESALE				BILLS PAYABLE								EQUIPMENT	
FOR JOB WORK		MERCHANDISE		GENERAL				MERCHANDISE					
PRODUCTIVE LABOR PAYROLLS	DIRECT JOB EXPENSES PERMITS INSPECTION FREIGHT, CARTAGE CARFARE, ETC	TOTAL PURCHASES FROM SUPPLIERS	DISCOUNTS EARNED ALLOWANCES RECEIVED LOSSES AND DEPRECIATION	EXPENSE INCURRED AND NOT PAID FOR — LOANS MADE	POSTED IN LEDGER	PAYMENTS MADE AND CREDITS ON EXPENSE ITEMS CHARGED — LOANS REPAID	POSTED IN LEDGER	MERCHANDISE AND MATERIALS NOT PAID FOR AT TIME OF PURCHASE	POSTED IN LEDGER	PAYMENTS MADE DISCOUNTS AND ALLOWANCES RECEIVED ON MERCHANDISE CHARGED	POSTED IN LEDGER	EQUIPMENT PURCHASED AUTOS AND TRUCKS MACHINERY FURN., & FIXT. BLDGS., ETC.	EQUIPMENT SOLD AND EQUIPMENT LOST, STOLEN DESTROYED & DEPRECIATED
11	12	13	14	15	16	17	18	19	20	21	22	23	24

MERCHANDISE AND JOB SALES RECORD

	MERCHANDISE & STORE SALES			JOB WORK							
				JOBS BILLED		ANALYSIS OF JOB WORK					
MISCELLANEOUS RECEIPTS	TOTAL CASH SALES AND SALES BILLED	RETURNS AND ALLOWANCES TO CUSTOMER	COST OF MERCHANDISE SOLD	JOB PRICE BILLED TO CUSTOMER	DISCOUNTS AND ALLOWANCES TO CUSTOMER	COST OF MATERIALS USED	TOTAL LABOR COST	DIRECT JOB EXPENSE PERMITS INSPECTION ETC.	TOTAL COST OF JOBS	GROSS MARGIN ON JOBS
38	39	40	41	42	43	44	45	46	47	48

count entitled "Deductions from Employees' Wages for State Unemployment Insurance." This tax item, of course, does not appear as an overhead expense item since it is merely held in escrow for the employee and the total amount of the employees' wages have already been entered as a proper charge against the business.

In the case of the employer's Social Security tax, however, a separate entry must be made following the payroll entry, the transaction to be designated "Reserve for Social Security Taxes," and the amount of such tax entered in the proper column entitled "Social Security Taxes" under Overhead Expenses and a corresponding figure entered in the general classification under Bills Payable in the column headed "Expense Incurred and Not Paid For." This amount should also be posted in the Bills Payable Ledger to an account entitled "Reserve for Employer's Social Security Tax."

The National Electrical Contractors Association feels that this Simplified Business Record System is of such value to the Electrical Contracting Industry that it has arranged to place it in the hands of every member of the Association who desires to put it into operation in his business without cost to the member for the original set. A working set of the Business Record System containing sufficient pages for several months use and put up in a practical and serviceable loose leaf binder will be given free upon request to present members of the N.E.C.A. whose current dues are paid up and to each new applicant accepted for membership in the Association.

1

Trough Wiring

A RECENT development in residence construction employs a fabricated and sectional steel framework, for which special consideration has been given to the installation of wiring without unnecessary burning or cutting of holes. This has been mainly accomplished through the use of metal wire-way baseboards on the second floor as a means of routing rubber covered conductors to points where concealed armored cable runs are to be extended up or down to various outlets.

The skeleton frame is composed of standardized sections or panels of light-weight steel to provide an economical and speedy method of construction. As an illustration, it is reported that the steel frame for a six-room residence with an attached garage was recently erected in Washington, D. C. by five men in thirteen hours. Provisions for wiring have been studied to allow for flexibility in layout without delaying steel erection, or requiring special cutting of the standardized framework.

Steel channel studs with horizontal sills or braces are welded together to form standard sections. Because the ends are cut square to bear upon the floor plates, there is no clearance for running horizontally in a partition without making holes in the steel webs of these studs.

The wiring is therefore expected to consist of vertical runs between the studs to wall or ceiling outlets from a continuous metal wire-way baseboard on the second floor. This baseboard has closely spaced knockouts in its back wall that permit taking off several cable runs in a space between studs. The horizontal sills occurring in the midlength of the studs are provided with punchings for running through to the ceiling space, and running down to first floor outlets. The web of the steel studs offers a vertical channel in which the armored cable runs may be placed out of the way. Where the panelboard is placed in the basement or on the first floor, the various branch circuits would need to be carried up to the second floor wireway. If a second panel location is selected for the purpose of shorten-

1. Metal wire-way baseboards were provided in each room on the second floor. Armored cable was run between steel studs to the first floor and second floor outlets from this distribution system. Convenience outlets were mounted on the removable portion of the baseboard.

2. The closely spaced knockouts in the back of the wire-ways made it possible to take off several armored cable runs in the clear space between any two studs.

3. Two switch boxes are mounted back-to-back on a flat steel mounting bracket. These brackets are adjustable for various stud centers, and must be bolted to the flanged edge of the steel studs. The cable was brought down from the second floor wire-way, and fed through a factory-punched hole in the horizontal steel sill which braces the door buck.

for Fabricated Steel Frame House

ing these runs, then the feeder would need to be routed from the basement to this panel, with short runs for tying the branch circuits into the wireway.

The second floor convenience outlets are mainly located directly on the upper removable portion of the wireway baseboard. The outlets occurring elsewhere are provided with flat steel supports that may be bolted to the face of stud flanges. These are offset to bring the outlet flush.

Since this type of construction permits interior finishing work to follow closely after the erection of the steel frame, the wiring installation must offer facilities for a speedy roughing in. The illustrations are from a home that was designed for the Berger Manufacturing Company, a division of the Republic Steel Corporation, and which was wired by the Electro Construction Company of Philadelphia, Pa.

SALES ANALYSIS CHART to sell *Lower Overhead*

Plant Objectives	Electrical Contracting Services or Equipment which Can be Sold to Help Attain these Objectives
1. Reduced Power Costs	Reduction in maximum-demand charges by— (a) Check-up in cooperation with local power company to ascertain best rate schedule (b) Arrangement of drives and control to permit automatic or manual cutting out of certain equipment if maximum demand is being approached (c) Signaling system to give warning when maximum demand is being approached
	Proper motor starting equipment, and adequate motor capacity, to prevent power surges
	Power factor correction
	Adequate wiring to prevent voltage drops and inefficient motor operation
	Surveys to determine possible power savings in change-over from group to individual drive
	By use of air-cooled transformers serve lighting and small appliance load from low rate power circuits
2. Reduced Maintenance Costs	Individual metering of certain departments to permit better control and allocation of power costs by management
	Definite periodic inspection by industrial electrical contractor or service shop of plant wiring and electrical equipment
	Assumption on contract basis by electrical contractor or service shop of all electrical maintenance—especially where industrial plant is too small to make economical use of its own facilities for such work
	Authorized renewal parts for best operation
	Modern overload protection on equipment, to prevent loss of time on momentary overloads
3. Expansion With Minimum Capital Investment	Maximum use of all available factory space for increased production by— (a) Equipment rearrangement, and drive modernization (b) Increasing usable factory space by modern illumination and ventilation—and, where central heating system is inadequate, by electric heating auxiliaries

Electrical Equipment which can be sold to *cut overhead*

- **Capacitors**
- **Circuit breakers**
  —modern protection against temporary overloads
- **Fans and blowers**
- **Lamps and lighting equipment**
- **Mechanical power transmission**
  —for relayout of equipment
- **Meters—indicating and recording**
- **Motors and control**
  —individual drives in place of group drives; variable-speed motors; gear-motors and special motors
- **Renewal parts**
- **Signaling equipment**
  —for maximum-demand control
- **Air cooled transformers**

Industrial Plants Will Buy

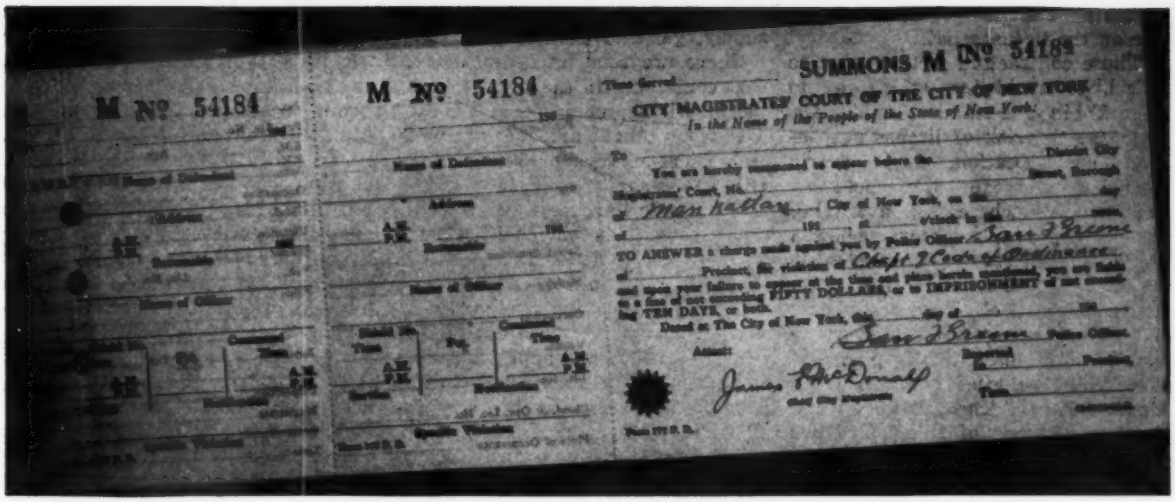
Lower Overhead

EVERY plant manager wants to cut his general overhead to the lowest possible figure. The electrical contractor approaching him on this point therefore has assured interest from the start. This is especially true today, when profit margins must be squeezed out of efficient operation.

This month's "Sales Analysis Chart" takes up three important items of definite and direct overhead charges in regard to which the contractor can sell specific types of services and equipment.

In considering power costs, electrical contractors are finding it increasingly worthwhile to foster good relations with the power sales departments of their local utilities. These departments are doing much to stimulate the use of load-building equipment in industrial plants. Their interests are obviously closely tied up with those of the contractor.

The past few years have been especially opportune for contractors to sell the idea of cutting overhead by the use of their special skill in maintaining and servicing electrical equipment instead of setting up plant facilities for such work—especially where an industrial plant is too small to make adequate use of trained electrical men on the payroll.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M Nº 54184

SUMMONS M Nº 54184

CITY MAGISTRATES' COURT OF THE CITY OF NEW YORK

In the Name of the People of the State of New York:

Each inspector carries a book of summons for haling offenders into the magistrates' court.

Reduces Bootleg Wiring 75 Per Cent

Police power for municipal inspectors helps New York City to cut down illegal electrical work.

BY VESTING its municipal electrical inspectors with police authority, the City of New York is waging a battle to secure safe wiring for its 7,000,000 inhabitants, which is estimated to have stopped about 75 per cent of that city's bootleg wiring. This method of enforcement was begun about three years ago in order to speed up the task of dealing with more than 4,600 master electricians, about 600 special licensed electricians (employed in large plants, hotels or office buildings), and an unknown number of miscellaneous handy men, fly-by-nights and the like. This system is operated throughout the five boroughs comprising the City of New York. It is designed to educate the public to a recognition of its own protection by virtue of having only licensed electricians do electrical work, and then also to have this work properly inspected.

Under the laws governing the courts in the City of New York, the inspector must actually see the illegal electrical work being done before a case can be prosecuted successfully. Because of this condition the inspectors are given the authority of special police officers. Offenders are either arrested and immediately placed in the custody of the precinct police authorities, or they are given an official police summons to appear in the magistrate's court. The court assignment is based upon the locality in which the work was done. These cases are tried in the regular procedure, the arresting inspector being required to appear in court to present the case against the defendant. The inspector's individual testimony is therefore legally recognized in court.

A SUMMARY OF OPERATIONS FOR THE FIRST NINE MONTHS OF 1935

106,910	Applications for inspection filed
230,187	Inspections made upon applications
99,718	Certificates issued
13,514	Violations reported
1,557	Orders to remove code violations issued
17,499	Applications pending as of Sept. 30, 1935
17,820	Resurveys, or reinspections of existing wiring systems made
7,734	Violations discovered
116	Disconnections of hazardous conditions not otherwise corrected

First offenders are usually fined $5.00 or two days in jail. Some of these fines are suspended because of exceptional character, or other reasons. The repeater, however, is dealt with much more severely under a maximum limit of a $50.00 fine or ten days in jail. This penalty is said to provide the principal deterrent, once an initial conviction becomes a matter of record.

A majority of license violation investigations indicate that the buyer employs non-licensed electricians knowingly to obtain cheap work. In other cases licensed contractors avoid inspections, when meter connection approvals are not needed, in order to get away with sub-standard wiring. In either case it is the city inspector who must run down the violation. By apprehending the "bootleg" element under special police authority, carrying with it the power to make arrests, the public learns that the license law has teeth.

When actual arrests cannot be made because of the escape of the electrician, the wiring must at least be taken over by a licensed contractor, checked over, and changed to comply with the city code, at whatever additional cost to the buyer. This action has brought about a wider public regard and precaution

in hiring electrical contractors who are on the licensed list.

Those contractors who attempt to chisel, to avoid inspections, or to "sneak" in sub-standard materials, do so at the risk of license suspensions or revocation, as is clearly provided for in the licensing ordinance. Such cases, averaging up to twenty per week are reviewed by a board of seven members, made up of an official from the inspection department, an electrical contractor, a power company man, a journeyman electrician, and a representative from the local Board of Fire Underwriters. The findings and recommendations of this board are subject to the approval of Maurice P. Davidson, commissioner of water supply, gas and electricity.

There are four important factors that contribute to the sifting out of illegal wiring, namely: (1) Unsafe conditions that are found while making re-surveys or reinspection; (2) the reports sent in by electricians who have seen someone installing what is obviously a bootleg job; (3) a city ordinance which prohibits any unlicensed person or firm from displaying a sign, claiming to be an electrician, and (4) free inspections and approval certificates that are furnished to all licensed applicants by the city for all wiring jobs.

Inspectors are constantly carrying on a certain amount of reinspection work, in addition to their regular inspection duties. This results in the finding and removal of many bootleg conditions. The reports that come in from the field often result in an arrest, or in finding someone at work who has failed to file an application for inspection. With a gradually aroused interest among the licensed contractors and their employees, and likewise a more complete knowledge on the part of the public, it is becoming more risky for persons to pose as licensed electricians, and particularly to put up a sign or to distribute circulars or business cards. Since there is no charge made by the city for inspections or approval certificates, a larger percentage of the small alteration and extension jobs received city inspection. This increases the frequency of inspection in patched-on wiring systems, and likewise offers further opportunities to check up on unauthorized wiring that may be done at various times.

Here then is a licensing system that protects the public against bootleg wiring, provided the licensed contractors themselves follow through in full compliance by filing applications on all their jobs, and by promptly reporting all evidence of the bootleg wireman's activities.

According to Nicholas J. Kelly, chief engineer of this department, and Bart F. Greene, acting supervising chief inspector, who directs the five borough chiefs and their seventy-four district inspectors, the short-cut methods employed in prosecuting unauthorized wiremen have received good cooperation from landlords, building managers, merchants and electrical men in general.

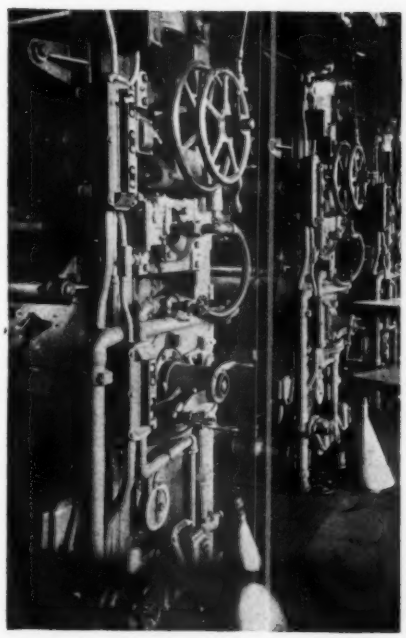
The most frequent classes of violators are said to be found among unemployed and unlicensed electricians, radio men, handy men in apartments, stationary engineers, janitors, building superintendents, electric sign agents, refrigerator sales and service shops, oil burner service shops, hardware electrical dealers, and dealers in new or second-hand electrical specialties or equipment. Much of their wiring is found to be sub-standard, and it must always be gone over thoroughly by the licensed contractor whom the owner finally employs before a formal inspection can be ordered.

A Record of 39 Cases *in Court*

OFFENSE	DISPOSITION
Unlicensed wiring	Reprimanded
Superintendent doing wiring	First offense—suspended
Motor wiring	$5.00 or two days in jail
Circuit wiring and fixtures	$5.00 or two days in jail
Apartment house alterations	$25.00 fine—suspended
Owner cited for hiring mechanic	Dismissed—lack of evidence
Unlicensed wiring and fixtures	$5.00 or two days in jail
Unlicensed neon sign installation	$10.00 or three days in jail
(two charges)	$5.00 or two days in jail
Unlicensed wiring alterations	$25.00 fine
Unlicensed P.M. operator	Insufficient evidence
Removal of warning and seal on cutoff wiring	Suspended sentence
Unlicensed motor wiring	Reprimand and suspension
Neon sign wiring	$5.00 fine
Wiring after expiration of license	$5.00 fine
Owner cited for hiring electrical mechanic	$5.00
Unlicensed electrician	$10.00
Radio store proprietor doing wiring	Suspended sentence
Neon sign wiring	Suspended sentence
Branch circuit wiring and fixtures	Suspended sentence
Light circuit extensions and fixtures	$10.00 or five days in jail
Owner cited for wiring	Dismissed
5 h.p. motor installation	$10.00 fine
Apartment wiring and fixtures	$5.00 fine
Unauthorized sign wiring	$5.00 fine
Unauthorized sign wiring	$5.00 fine
Branch circuits in store	Suspended
Circuit wiring and fixtures	$5.00 fine
Falsely applied under the name of a licensed electrician	$25.00 fine
Unauthorized sign work	$10.00 fine
Circuit wiring	1 day in jail
Owner cited for wiring	Suspended
Circuit wiring and fixtures	$5.00 fine
Unlicensed wiring in theatre	$5.00 fine
Circuit wiring	$5.00 fine
Building superintendent doing wiring	$5.00 fine
Neon sign wiring	$5.00 fine
Building agent doing wiring	Suspended
Filed application but not licensed	$10.00 fine

1. The high speed "Coloroto" press for printing rotogravure newspapers in colors. Highly volatile inks are used which will ultimately permit running impressions at 20,000 to 25,000 cylinder revolutions per hour.

Electrical Hazard Control in High Speed Printing Plant

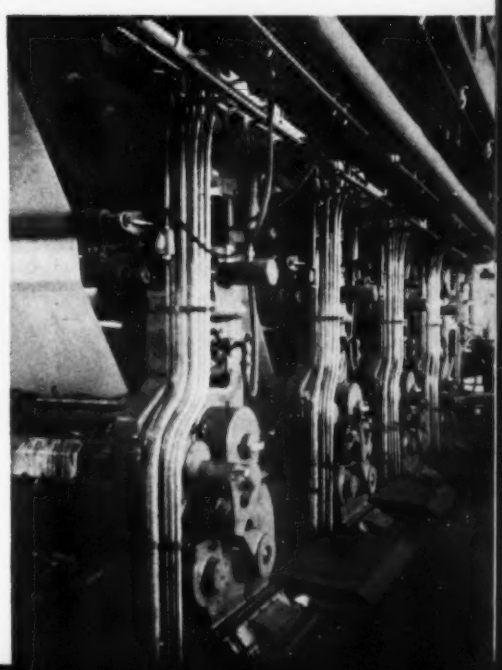


2. The various control stations at each of the ten press units were housed in explosion-proof fittings. Each press unit comprises stations for controlling (1) ink circulating pump (bottom left); (2) exhaust fan, ink supply pump and supply fan (three switches near floor); (3) cylinder raising motors (middle group); (4) local press control station (upper left) with buttons marked ("Safe," "Decrease," "Increase," "Inch," "Stop"); and (5) by-passing switch for the cylinder raising drive (at right of local press control station). This by-pass switch shunts out the cylinder travel limit switches, when cylinders are to be raised beyond their normal limits.

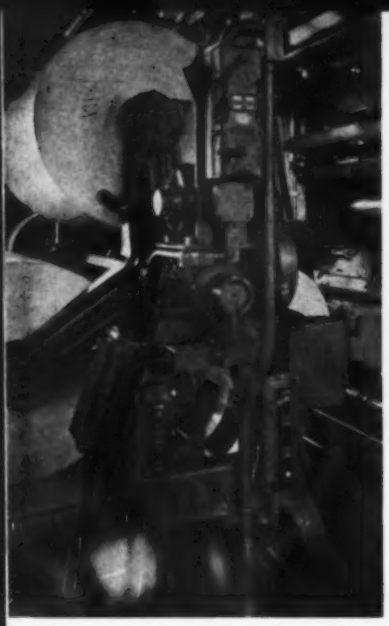
THE use of highly flammable inks in the operation of rotogravure news presses at high speeds has introduced fire and explosion hazards in newspaper production. A recently completed high speed rotogravure press installation in the Brooklyn, N. Y., plant of the Daily News has therefore been provided with explosion-proof motor drives and control stations. Wherever practicable, the arc-producing control equipment for various small auxiliary motors has been racked on the floor below. A separate room was also provided on this lower flower to isolate the automatic control switchboards and feeder panels for the main motor drives.

The wiring methods were also modified from conventional practice to avoid the massing of conductors and so prevent them from becoming ignited if their raceways should become vapor saturated or fume-laden from the volatile inks. There are no long horizontal runs of conduit at the press, but instead, the various control station runs and motor circuits are routed on the ceiling below. Separate conduits were stubbed up at their proper riser points and then run exposed along the press unit frames. All conduits were carefully grouted where they passed through the concrete floor to prevent the seepage or circulation of fumes to the lower floor.

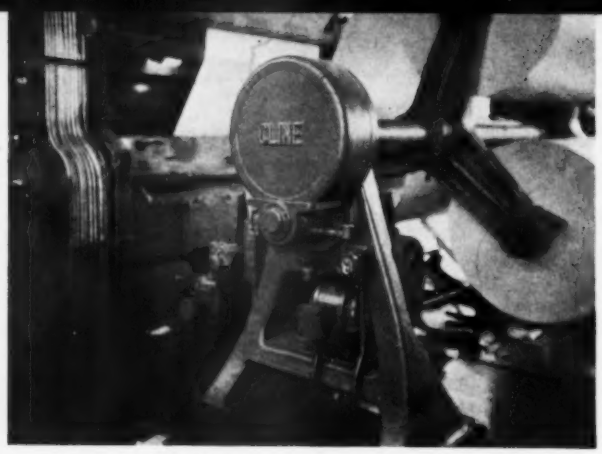
In addition to the flammable nature of the ink vapors, the fume-laden atmospheric condition thus created near the presses was injurious to the press crews. A dual air circulation system was provided which carries the fumes from each



3. This plant was wired without using the conventional wireway that is ordinarily installed for the length of newspaper presses to enclose the many control conductors. Individual conduit runs were brought up instead from the ceiling below and routed along the press to their proper stations. A minimum number of wires is to be found in a group, thus reducing the possibility of outages from insulation fires in fume-filled raceways. The static neutralizer system wiring was run under the press gallery (upper right) on special insulators.

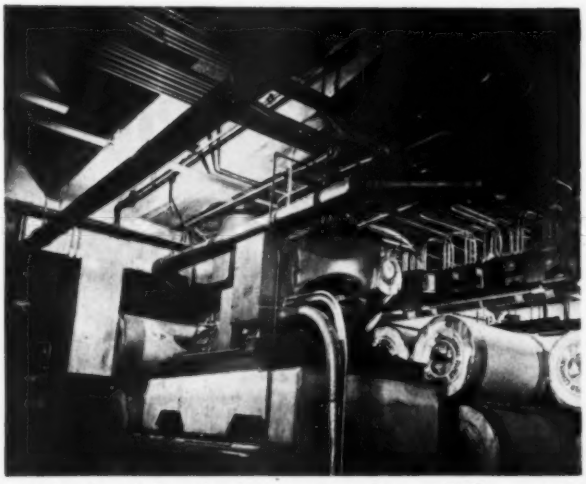


4. The controls for reel tension, reel rotating, and flying paster motors, as well as an emergency press control station, all of the explosion-proof type, were closely spaced upon the frame-work of this unit. Each station was supplied by a separate conduit that was run from the ceiling below.



5. Three 1500-lb. rolls of paper are carried on this reel. The rotating motor (right), and the flying paster motor (left), are both explosion-proof, with their conduit runs terminated in heavy cast-iron housings at the motor frames.

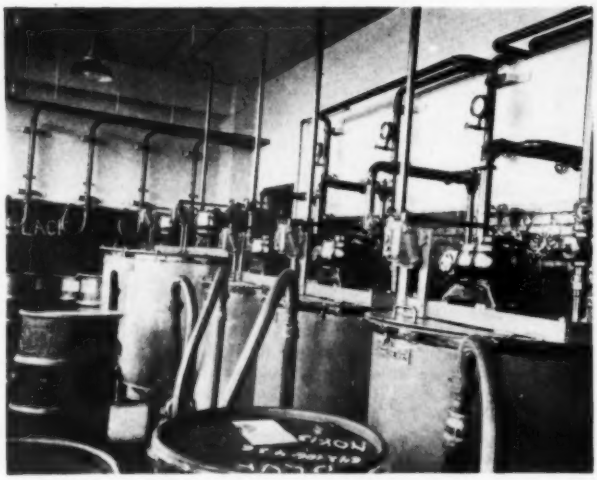
7. Here at the opposite end of the ceiling under the press is the second drive and the end of the long row of ceiling-racked equipment. A typical stub-up condition for conduit runs may be seen in the center-line of the ceiling. Careful grouting of these stubs is said to exclude explosive ink fumes from the floor above.



6. The floor below the presses where the two 125-hp. motors and their smaller "inching" motors, which drive their respective halves of this 10 unit press installation, are located. Special housings for the silent chain drives were grouted in the concrete floor to prevent fumes from seeping down to this area. The various magnetic switches, control circuit terminal cabinets, and other incidental equipment are racked in a line below the press. Separate conduit runs were routed on the ceiling to their riser points.

8. A generous number of explosion-proof polarized receptacle outlets was provided for portable motors and inspection lamps. Various signal lights as in the center background, were attached to the press framework, with seal-off fittings inserted above them.

10. From the explosion-proof ink pump motors the circuits were likewise run to their isolated controllers.



9. The ink preparation vats in a special room were equipped with explosion-proof agitator motors and remote control push-button stations, from which the conduit runs were routed to magnetic starters outside this space.

press unit to the roof and replaces this volume of foul air with conditioned air in a like quantity. Thus each press unit was equipped with two systems of ducts, each with its individual explosion-proof blower motor. This system required careful adjustment to provide a neutralized condition that would be reasonably free from objectionably strong air currents in the path of the swiftly-moving sheets of news print.

A static neutralizer system using a network of high-tension conductors exposed on special porcelain insulators along the entire roto press, was provided to prevent fires from static sparks. Taps are run off at each unit to a rigid collector bus at each cylinder. Here a series of collector coils that are insulated from the high tension bus attract the electrostatic charges that accumulate upon the surface of the paper and thus become neutralized by counter inductive action.

The wiring was installed by the Naumer Electric Company of New York, N. Y.

The shop superintendent's office, where a clerical assistant checks departmental production records, and from handy card indexes works up job papers for quick billing

PRODUCTION CONTROL

for Shop Costing and Billing

A PRODUCTION control procedure is operated by Berger Bros. Electric Motors, Inc., Rochester, N. Y., to secure, (1) speedy customer invoicing, (2) accurately distributed costs, (3) shop-controlled office billing methods, (4) divisional analyses between estimated and actual labor costs, and (5) a simplified apparatus data system.

Customer job forms were developed which provide permanent data records of the apparatus, break up the service operations both as to estimated and actual labor costs, and provide clearly for the receiving and shipping of all units of equipment involved. These forms are in quadruplicate, and are all retained in the departmental completed job files. One page of this set is used as a preliminary long-hand fill-in form which is used by the billing clerk for typing the final invoice.

Stock repair order forms are more simplified, since there is no customer involved. The forms for such work include a greater number of data items than for customer work, because this information must provide a complete specification for future reference.

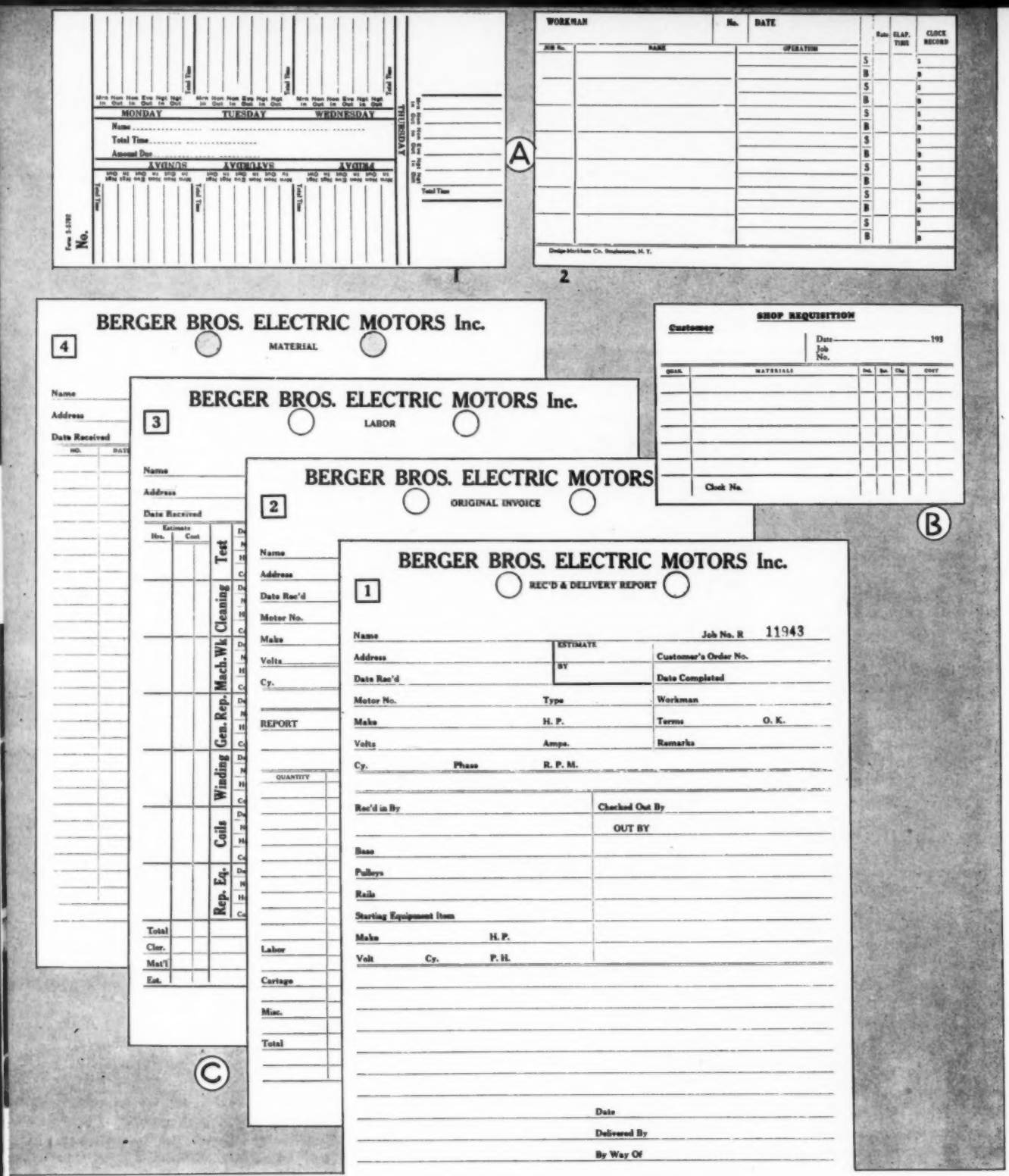
The customer and stock repair order forms each provide for a breakdown of service work into eight labor cost divisions. This may be done in making estimates, and is always carried out in detail for all production. It gives a means of analyzing and localizing the department which may be the cause of excessive labor costs. This is particularly helpful when complaints are made by customers, because this cost record will indicate clearly any unusual condition which would cause the job to run higher than the average for similar work.

Labor Records

The correct distribution of shop labor is controlled by the use of dual time-clock cards. One card records the daily employment time in regular forenoon and afternoon periods, and also in night-work periods. Another time card must be used for each employee for distributing his time to the jobs he is working on during each day. The totals of these two time cards must be in daily balance. The labor distribution form provides spaces for seven jobs, each space being punched for the beginning and stopping time of that job, and the type of work being inserted in the proper operation spaces. Additional forms are used when one man works on more than seven jobs in one day.

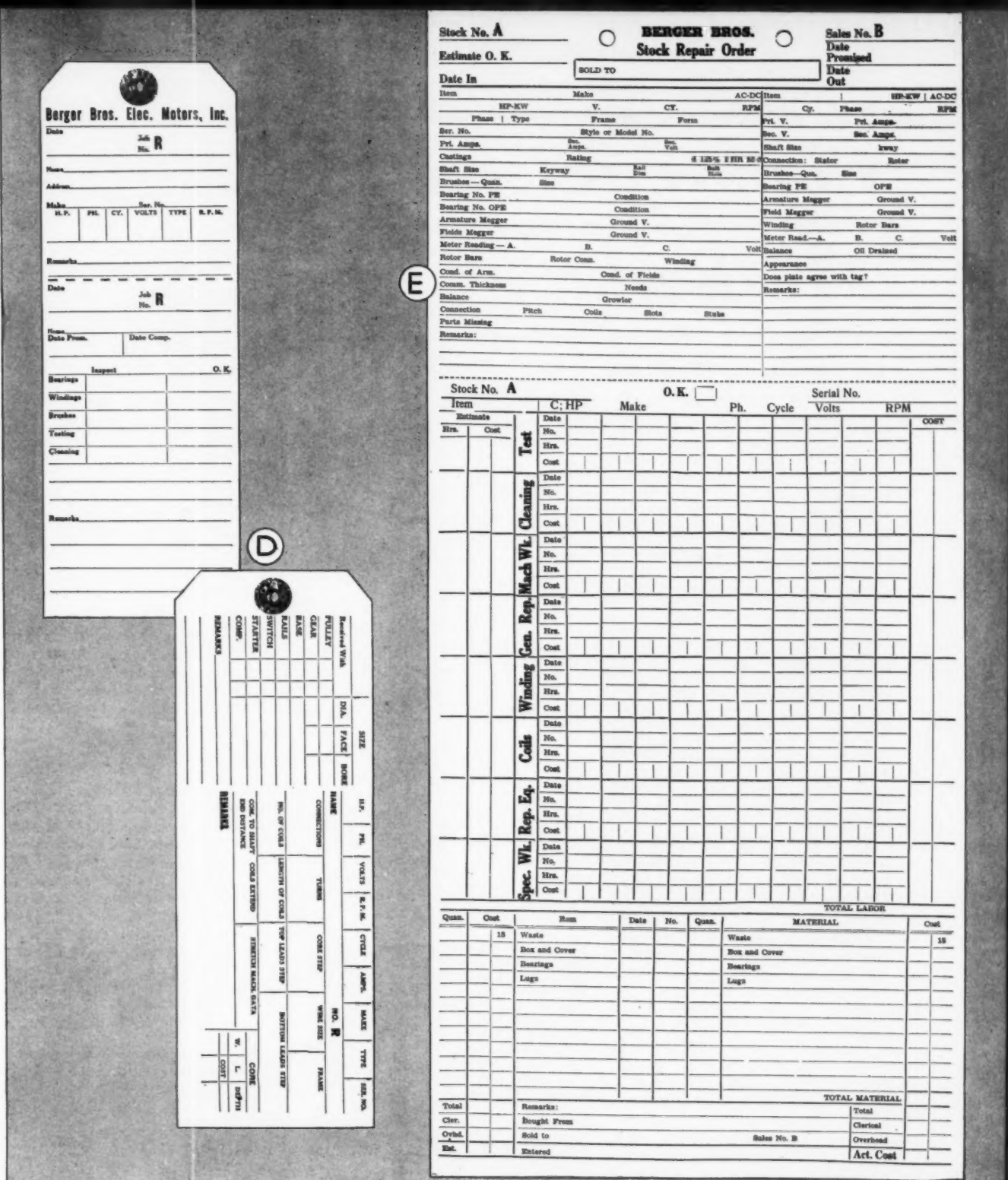
Material is requisitioned from the stock clerks in conventional manner, using a 3-in. by 5-in. form. This form is provided with cost columns for each item. Cost card index trays are provided in the stock rooms and shop office from which these requisitions are shop-costed.

All jobs are invoiced during the day following their completion. Because the various items which constitute customer repairs are under constant shop control, it is possible to prepare progressive costs so as to be ready for quick clearance to the invoice typist upon the completion of a job. Since the invoice is edited in the shop office and filled out in long-hand, there is no need of submitting the typed copies back to the shop for review before they can be mailed out. They have already been checked for reasonableness of charges, for the correct description of work done, and for the materials or parts to be charged. *(Continued on next page)*



(A) Employee Time Clock Cards, (1) The weekly pay roll record, and (2) Job distribution record.
(B) Shop Requisition Form.
(C) The quarduplicate forms are for customer repair only. No. 1. Shipping record; No. 2. The memo billing form which is made out by the shop in long-hand for the invoice typist; No. 3. The cost analysis record; No. 4. Material record which is forwarded to No. 3, and checked in editing No. 2.

After the incoming customer order has been written up on its quadruplicate production record form, a two-part identification tag is also filled out. This has a perforated end section which is removed and becomes a permanent customer apparatus data record. It will be noted that the reverse side of the apparatus tag has spaces for describing the equipment that may have been sent in with a motor. The front side of the removable portion has five ruled spaces for the receiving inspector to report his findings, and similar spaces for the various departments to insert their final o.k. on completed repair opera-



tions. This o.k. space fixes a definite responsibility upon each mechanic who performs final tests or inspections.

The functioning of this system hinges primarily upon close shop superintendence. For this reason, a clerical assistant is maintained in the shop office whose sole duty is clerical supervision to keep the completed job records flowing smoothly to the general office staff. They only reach the office after the departmental processes have all been cleared in the shop to the satisfaction of the production control supervisor. Office workers are not expected to know shop details.

(D) Combination identification tag and perforated removable customer apparatus data record.

(E) Stock Repair Order. The upper portion is removable for filing as a permanent record of reconditioned apparatus, and to whom sold. This form is 8¼ in. wide. The upper section is 5¾ in. long, and the lower section is 12¼ in. long.

Construction . . Methods . . . .

Extra Motor Frame Grounding in Explosive Areas

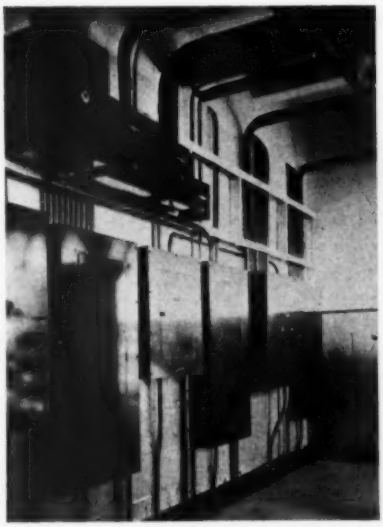
An added precaution to insure adequate grounding current paths for the motors operated in a flammable volatile ink manufacturing plant in New Jersey, resulted in the installation of a 2/0 bare stranded copper grounding bus throughout the length of this plant. The opposite ends of this bus were connected to a series of driven grounding electrodes, while lateral tap-offs of No. 6 bare stranded copper were extended to various motor locations. Because of the mechanical strength of the 2/0 copper, it was laid upon the graded earth without protecting raceways and covered by the permanent concrete. The No. 6 tap-offs were mainly composed of short runs to motor foundations and were also concealed in a like manner. Where these runs were extended up to the motor base a ¾-in. conduit protective sleeve was provided along the concrete foundation. All taps and connections to the galvanized pipe grounding electrodes were made with solderless copper connectors of the U-bolt clamp type. This work was installed by the National Electric Company, Inc., Passaic, N. J.

Connecting Auditorium Dome Fixtures

A typical connection for several auditorium ceiling fixtures in a Jamestown, N. Y., high school involved separate ¾-in. rigid conduit for three branch circuits. The conduits were run exposed in the attic space upon the wire lath supporting channels that formed a curved dome ceiling. Because each fixture unit was subject to final adjustment within a metal hanger frame, a flexible conduit connection was provided. Flexible cross-over connections were also used for carrying the circuits from one lengthwise wireway to its opposite member. This simplified method of connection eliminated the cutting, bending and fitting of rigid conduit and fittings in a work area where the mechanics had to do all of their work on temporary planking or upon narrow permanent "catwalks." This work was installed by the Linquest Electric Company of Jamestown, N. Y.

Bolting Heavy Equipment to Hollow Tile Walls

A row of special distribution panelboards was racked along a hollow tile wall and secured by a series of sixty-one bolts, each of which employed 4-in. square steel plates at the opposite side of the tile. A steel rack above the panels for mounting automatic controllers was provided with horizontal angle irons on the opposite side of the wall. The upper angle iron was bolted at each end to the bottom face of a concrete floor beam. This provided an additional support for the tile wall to prevent it from buckling or cracking under the weight of the equipment that it supports. By using the steel plates for each bolt head, and the lengthwise angle irons, it was possible to make the equipment secure without danger of crushing the tile. Toggle fastenings through



Front and back sides of tile wall showing racking and bolting

"I'VE MADE MONEY IN CONTRACTING"

"ANY MAN WHO MAKES A GO OF ELECTRICAL CONTRACTING CERTAINLY MUST KNOW WHAT I'VE FOUND OUT. YOU BUILD A BUSINESS ON DETAILS. IT ISN'T THE BIG THINGS THAT HANG A FELLOW...YOU CAN STOP THEM BEFORE THEY GO TOO FAR. BUT THE DETAILS OF BUSINESS, A LITTLE WASTE HERE, A LITTLE BAD JUDGMENT THERE, A LITTLE CARELESSNESS -MAN, WHAT THOSE DETAILS DO TO THE BANKROLL.

"SO DON'T KID ME ABOUT DETAILS IN ANYTHING LIKE A SAFETY SWITCH. GIVE ME A SWITCH WHICH IS RIGHT IN ALL ITS DETAILS AND I'LL GIVE A JOB THAT SATISFIES THE BUYER AND DOESN'T ROB ME OF MY JUST PROFIT."

Do Knockouts Count?

IT MAY BE important only to the electrician or maintenance man that C-H Safety Switches have more knockouts, in greater size range, more conveniently located, and that they come out easy and clean. After all, a knockout is only a detail.

But then, so is the spring, so is the handle, so are the mounting bosses. And if you're going to slight details, where are you going to start . . . and WHERE ARE YOU GOING TO STOP?

C-H believes that no detail can be slighted; that only as *each* detail is perfect, can you have a perfect safety switch. That is why C-H expends more care than perhaps you think necessary on every detail of every safety switch; that is why, we believe, C-H Switches are selling so well. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus*, 1306 St. Paul Avenue, Milwaukee, Wisconsin.

● *The C-H line includes all types and sizes of Standard, Weatherproof and Explosion-Proof Safety Switches, and Range Switches and Service Equipment for every locality — all built to the famous C-H Control Leadership Standards.*

CUTLER-HAMMER C-H SAFETY SWITCHES

NEWS
FROM WIREMOLD
"THE BUSINESS BOOSTER FOR CONTRACTORS!"

THE WIREMOLD COMPANY ◆ ◆ ◆ HARTFORD, CONN., U. S. A.

Now we deal you the winning hand!

WIREMOLD
4 ACE COMBINATION

One strip that has everything—does everything—sells everybody!

♠ A — Provides for really PRACTICAL CONTINUOUS OUTLETS (Every 3 inches if needed) using solid, sturdy STANDARD Wiremold receptacles—durable and *lasting!*

♥ A — Makes it easy to modernize WINDOW & STORE LIGHTING —"novel effects at small cost!"

♦ A — Provides a great variety of inexpensive COVE and PANEL COMBINATIONS —easy to sell and install.

♣ A — Greatly simplifies the installation of LUMILINE LAMPS— and multiplies their usefulness.

HERE, at last, is a plug-in and light strip which encourages new business and then makes that business profitable to the contractor—because it can either be assembled in his shop and then taken to the job all ready to install, or else quickly assembled on the job. (In both cases ALL of the work is done by the contractor's OWN workmen.) Send for special folder.

"Wiremold HELPS the Contractor!"

a single web of the hollow tile were not considered safe for permanently supporting the equipment. This work was done by the Naumer Electric Company, New York, N. Y., in wiring a newspaper plant at Brooklyn, N. Y.

Odd-Level Ceiling Runs Made Uniform

Vertical box supporting nipples which were attached to ceiling crowfeet provided a rigid method for supporting exposed ceiling outlets in a large auto service station in New Jersey. This supporting method resulted in all outlets being kept on a uniform level without regard to variations in sizes of ceiling beams, and also reduced the amount of difficult bends that would otherwise have been required had the boxes been attached directly to the beams, and to roof sheathing, where outlets occurred between beams.

The Shaw Electric Company, Newark, N. J., used ½-in. conduit nipples for supports, these being secured to the back knockout of the outlet box with a bushing and double locknuts. The opposite end was threaded into a standard conduit coupling and male crowfoot, the latter being attached to the structure with wood-screws.

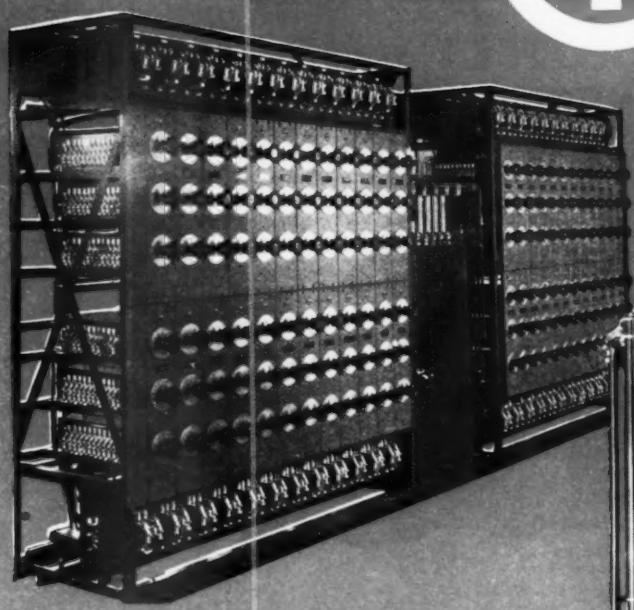
Moving Outlets for Paneled Walls

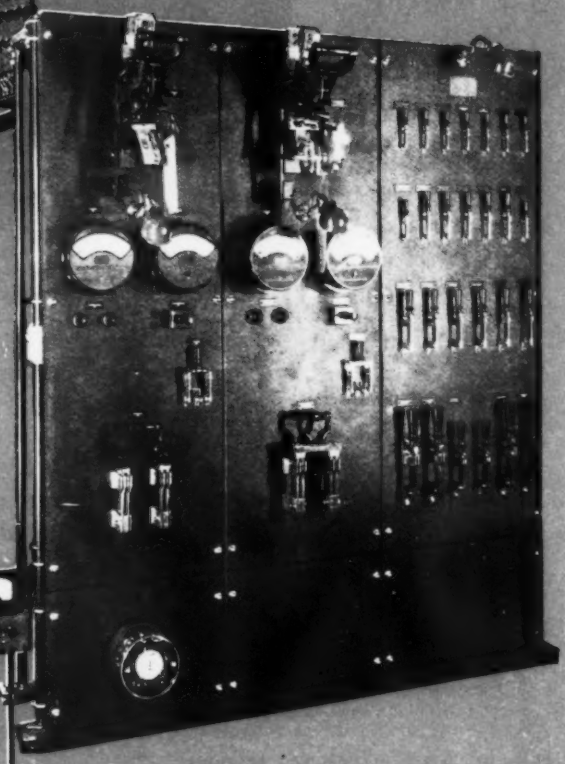
In remodeling buildings for wood paneled walls, it is seldom practical to use abandoned wall outlets as junction or extension outlets, because of the objection to cutting into the new paneling to make the blank box cover accessible. An abandoned wall outlet, fed from the concrete floor was removed, and the conduit was used as a raceway to fish a new armored cable branch circuit into this area. Be ause the cable was run continuous from an outlet on the basement ceiling through the old outlet location to a new outlet at the

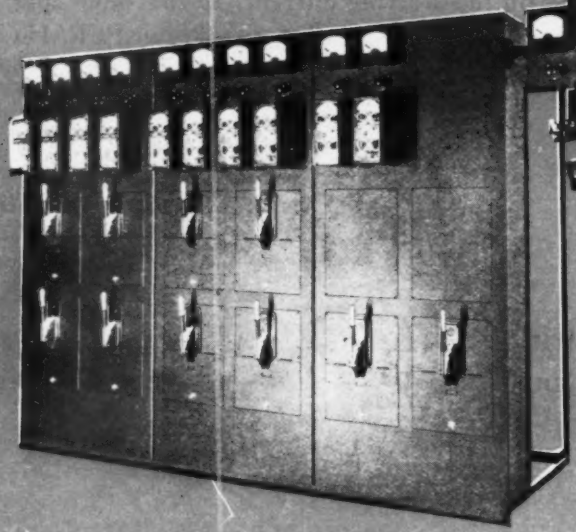
TRUMBULL CAN SOLVE YOUR SWITCHBOARD PROBLEMS

DEAD FRONT BOARDS

Streamline in appearance with modern circuit protective devices of all types and ampere ratings.







Above is a testing switchboard arranged so that any voltage from 3/10 of a volt to 480 volts may be obtained—*by 3/10 volt steps*—for the 40 circuits.

At the right is a live front generator switchboard. Note the neat, compact arrangement for positive control and protection.

Below is a typical dead-front switchboard. Feeder switches are of the FOI (Front operated interlocking) type, each circuit being metered by both indicating and integrating instruments.

The Trumbull Electric Mfg. Co. with switchboard plants at Plainville, Ludlow, Los Angeles, San Francisco, and Seattle, is strategically located to serve your switchboard requirements.

Engineers from these plants and conveniently located branch offices are always available to discuss YOUR PARTICULAR SWITCHBOARD PROBLEMS as to design, construction, and cost.

Switchboard Manual giving a wealth of detail and engineering information is available.

Write for Bulletin No. 101.

The TRUMBULL ELECTRIC MFG. CO.

PLAINVILLE A GENERAL ELECTRIC ORGANIZATION **CONNECTICUT**

NEW YORK • CHICAGO • BOSTON • DETROIT • ATLANTA • PHILADELPHIA • LUDLOW, KY. • SAN FRANCISCO, CALIF. • LOS ANGELES, CALIF • SEATTLE, WASH.

FUSES MADE TO PROTECT • NOT TO BLOW

GET THE FACTS—

"Recently, as a matter of courtesy to a friendly salesman, we agreed to check the performance of some 'ordinary' 60 ampere 600 volt fuses on a circuit controlling a 30 ampere motor. A complaint came in immediately from the maintenance electrician that the fuses were popping out on the starting current. In the same spot BUSS *Super-Lag fuses had protected for several years without* PERMITTING A SINGLE PRODUCTION DELAY *due to their not meeting the starting requirements of the motor."*

So says The Electrician of the Cherokee St. Plant, International Shoe Co., St. Louis.

Like other alert maintenance men he is vitally interested in any item that will help free operating schedules of needless interruptions.

Executives interested in plant operation sometimes overlook the inexpensive fuse when they are checking operating schedules—yet "Fuses made to protect—not to blow" offer them a practical way to . . .

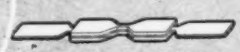
...prevent the RECURRING SHUTDOWNS caused by NEEDLESS BLOWS!

After all, since we are dealing with money-waste isn't it a matter well worth executive investigation to determine just how senseless and unnecessary shutdowns can be eliminated—just how fuses are made to protect—not to blow—just how others have profited handsomely by investigating . . .

WHY BUSS FUSES DON'T BLOW NEEDLESSLY

10 Features

In the design of the FUSE-CASE help make it possible and . . . .



The Super-Lag

development in the FUSE LINK completes the job.

GET THE FACTS

Even though you may be but remotely interested in your company's earnings . . . you will obtain enough new information from this booklet to make your suggestions on prevention of needless shutdowns a valuable contribution.

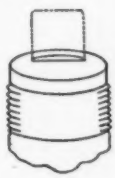
It is replete with refreshing facts on a subject receiving far too little executive attention.

A line from you requesting it, will bring your copy by return mail.

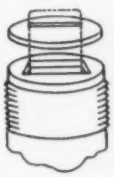
BUSSMANN MFG. CO.
2536 W. University St.
St. Louis, Mo. . . . . *A Division of the McGraw Electric Company*

Check this "BLOW-PROOFING" idea on a BUSS Fuse

It stands to reason that a link torn or badly strained, is not going to carry its rated amperage—therefore on BUSS fuses the link is held against twisting when the fuse is renewed.



Note that one end of the link is held snugly in a slot. It can't twist as the cap is tightened.



The other end is locked by a slot in the washer against the square opening in the fuse case.

You don't have to be EXTRA careful with a BUSS fuse—for the design automatically safeguards the link against injury—just as it automatically safeguards the user against needless blows and senseless shutdowns.

Executives who have the "feel of the plant"—who like things mechanical—will "get a kick" out of observing the nicety with which each part of the BUSS design is fitted to its job of making a fuse to protect—not to blow.

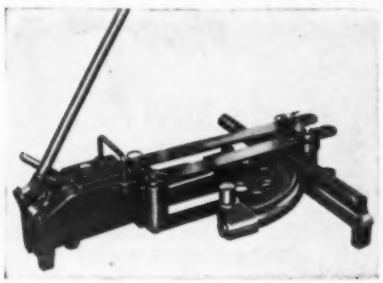
Why not investigate.

BUSS superlag FUSES

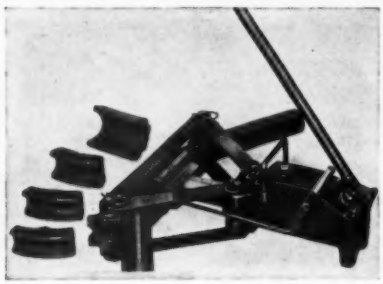
YOU CAN SAVE *time and money* WITH GREENLEE TOOLS

CONDUIT BENDERS • KNOCKOUT TOOLS • PIPE PUSHERS • BORING TOOLS

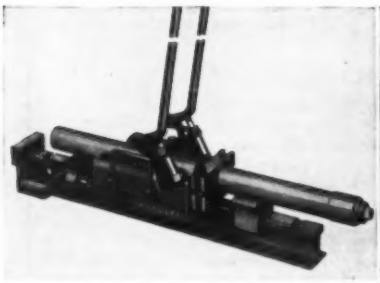
Now is the time to prepare for the coming building season. Start this preparation by seeing that proper tools are on hand to do wiring with the greatest possible efficiency. Greenlee Tools quickly pay for themselves out of savings. Ask for complete information now.



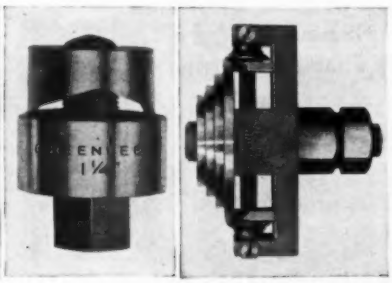
Above is the Greenlee No. 770-T Bender for thin-wall steel conduit. Same as No. 770, but with different attachments. Bends quickly and easily, without crushing. Complete forward movement of the ram makes full 90-degree bend. Will handle 1¼, 1½ and 2-inch conduit.



Above is the Greenlee Hydraulic Bender for rigid conduit. It is simple to operate, easily portable, and makes bends quicker and better than by other methods. No. 770 bends all sizes from 1¼ to 3-inch. The large bender, No. 775, handles all sizes from 2½ to 4½-inch.



Greenlee No. 790 Hydraulic Pipe Pusher saves money on underground installation of pipe and conduit. Eliminates much trenching, back-filling, etc., and saves lawns and pavement. Easy for one man to operate. Will exert maximum pressure of 40,000 pounds on pipe clamp. Capacity for pipe from 1¼ to 4-inch.



Greenlee Knockout Tools enlarge holes for conduit quickly and accurately, without reaming or filing. Convenient to operate. Punches come in two sets. No. 735 is for ½, ¾, 1 and 1¼-inch conduit, while No. 737 is for 1½ and 2-inch conduit. No. 740 Cutter will enlarge holes for 1½, 2, 2½ and 3-inch conduit.

GREENLEE TOOL CO., Rockford, Illinois

Mail This Coupon To-day

GREENLEE TOOL CO., ROCKFORD, ILL.

Please send information on the following tools:

☐ Rigid Conduit Benders ☐ Thin-Wall Conduit Benders ☐ Pipe Pushers

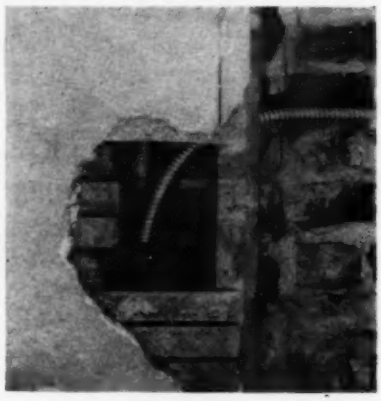
☐ Knockout Tools ☐ Joist Borers ☐ Electricians' Bits ☐ Bit Extensions

Name ..... Address .....

City ..... State .....

My Jobber is 2-36

right of the old outlet, the paneling could be applied without providing a junction box opening. In addition it



was not necessary to cut a hole in the concrete floor for this new run. This method was employed by the Beacon Electrical Engineering and Construction Company, in remodeling a commercial building at Buffalo, N. Y.

Coupling-Nippled Boxes

In connecting a group of magnetic switches and their disconnecting switches to a horizontal wireway, a uniform horizontal alignment was obtained by using a ¾-in. conduit coupling, and two Chase nipples for each connection. The hub or shoulder of the coupling is pressed tight against the box wall because of the compression effect of the tightened Chase nipples on the inside of the wireway and in the switch enclosure. The upper row of switches was blocked out with two lengthwise strips of 1½-in. by ⅛-in. channel iron, to place the switch knockouts plumb with those provided in the 3-in. by 6-in. wireway. This work was installed by Joseph Newman, Inc., of Jersey City, N. J., for controlling

boiler room motors in a new local armory building. The raceway is connected at the left end to a power distribution panelboard.

CASH IN ON MERCURY VAPOR JOBS

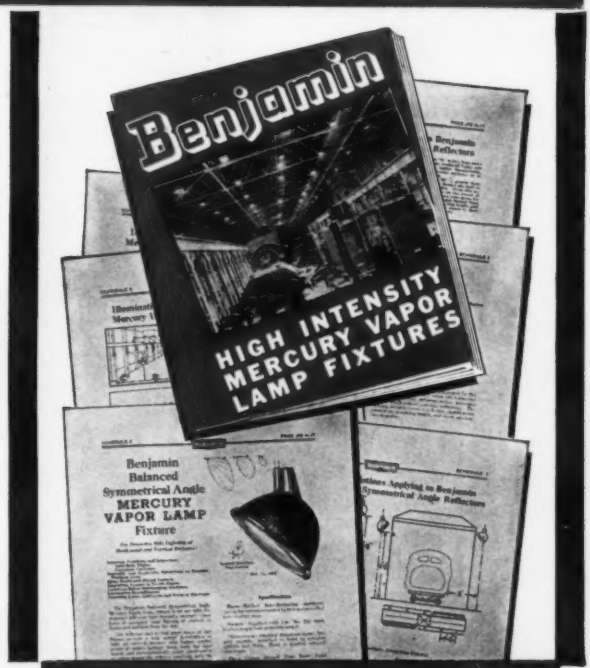
NEW BENJAMIN BULLETIN GIVES FACTS AND FIGURES TO HELP YOU GET BUSINESS

Here is the "brass tack" information every contractor will want to have about the new High Intensity Mercury Vapor Lamp and the complete new line of Benjamin Reflectors and Floodlights designed especially for this latest development in the Science of Seeing.

In this 28-page data bulletin you will find the answers to your questions about Mercury Vapor lighting and how to cash in on it now. You will find complete details about the lamp, transformers and reflectors which you will need in selling and planning Benjamin Mercury Vapor installations. You will find numerous photographs, like those above, together with tables of footcandle intensities, diagrams and installation instructions in most complete and easy-to-use form.

Here is the information you need to turn Mercury Vapor interest into Mercury Vapor Lighting installations with profitable wiring business for yourself.

Make sure of getting a copy of this up-to-the-minute data bulletin now. It's yours for the asking, just sign and mail the coupon today. Your copy will be sent by return mail.


Benjamin
HIGH INTENSITY MERCURY VAPOR LAMP FIXTURES
Benjamin Balanced Symmetrical Angle MERCURY VAPOR LAMP Fixture

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BENJAMIN TRADE MARK

BENJAMIN ELECTRIC MFG. COMPANY
DEPT. EC DES PLAINES, ILLINOIS

Please send me a copy of your FREE bulletin on Mercury Vapor Lighting with Benjamin Reflectors and Floodlights giving complete installation data for contractors.

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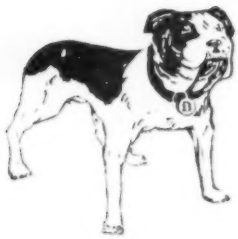
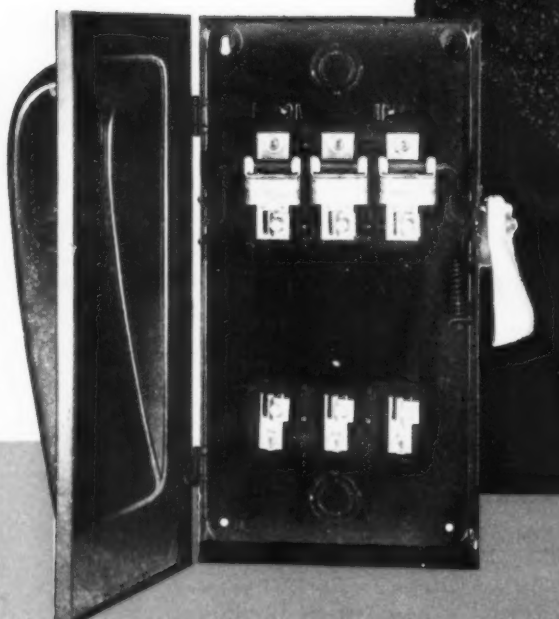


Only **BULL DOG**
has the New Exclusive

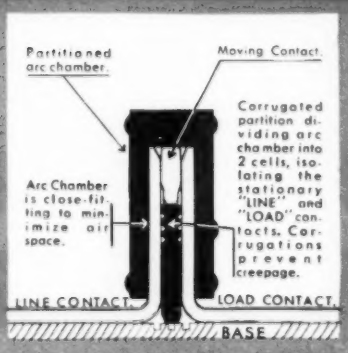
Vacu-Break

PRINCIPLE



Modern
Stylined
Cabinet

If the safety switch that you are now buying hasn't the new *Vacu-Break* principle with floating contact, it is old-fashioned. Here is the *SAFEST* safety switch ever designed. The principle is so simple you will wonder that someone hadn't thought of it before.


Partitioned arc chamber.
Moving Contact.
Corrugated partition dividing arc chamber into 2 cells, isolating the stationary "LINE" and "LOAD" contacts. Corrugations prevent creepage.
Arc Chamber is close-fitting to minimize air space.
LINE CONTACT.
LOAD CONTACT.
BASE

Full "ON" Position . .
The partitioned arc chamber, with moving contact floatingly supported therein, moves on the stationary self-guiding "LINE" and "LOAD" contacts.

ILLUSTRATING THE *Vacu-*

the REVOLUTIONARY NEW *Vacu-Break* SAFETY SWITCH

3 LINES • MASTER TYPE "A" • STANDARD TYPE "C" • JUNIOR TYPE "D"

COMPACT SIZE and SOLDERLESS LUGS

Are Also Standardized Features of ALL 3 LINES

BULL DOG has again set a new standard of quality for safety switches, based on a fundamentally basic principle of arc control. The principle is so simple and so highly effective that you will really be amazed. The BULL DOG *Vacu-Break* Safety Switch is extremely compact in design! Ask your jobber or distributor to show you these extraordinary new switches. They are available in a complete line, including every price range — MASTER (Type A) — STANDARD (Type C) — JUNIOR (Type D).

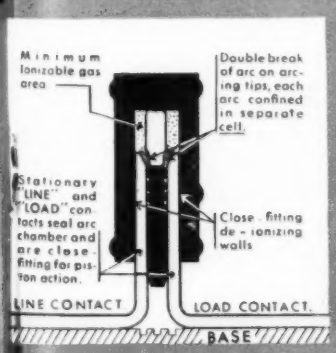
The arc is double sealed, which permits the switch to be operated under extreme over-load, with perfect safety to the operator. WIRE GRIPS (solderless lugs) are standard for the "line" and "load" wiring terminals. *Vacu-Break* switches are smaller in over-all cabinet size, yet they provide adequate wiring room at points where most desirable. *Vacu-Break* Safety Switches are housed in Stylined modern cabinets, with handles to match . . . the most attractive safety switch on the market.

Ask Your Jobber for Details and Prices

BULL DOG ELECTRIC PRODUCTS CO.

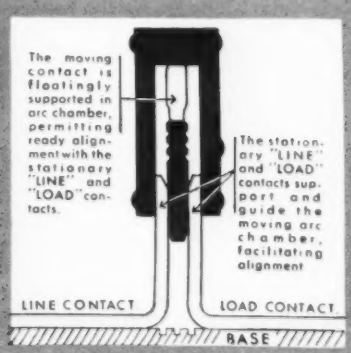
DETROIT MICH. U. S. A.

In Canada: Bull Dog Electric Products Co. of Canada. Ltd., Toronto, Ont.


Minimum ionizable gas area
Double break of arc on arcing tips, each arc confined in separate cell.
Stationary "LINE" and "LOAD" contacts seal arc chamber and are close-fitting for piston action.
Close-fitting de-ionizing walls
LINE CONTACT
LOAD CONTACT
BASE

Rupturing the Circuit . .

The quick outward movement of the housing on the close-fitting stationary contacts creates a piston action tending to eVACUate air from the arc chamber.


The moving contact is floatingly supported in arc chamber, permitting ready alignment with the stationary "LINE" and "LOAD" contacts.
The stationary "LINE" and "LOAD" contacts support and guide the moving arc chamber, facilitating alignment
LINE CONTACT
LOAD CONTACT
BASE

Full "OFF" Position . .

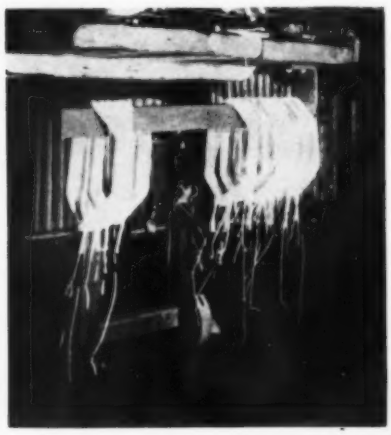
The stationary "LINE" and "LOAD" contacts remain partly inserted in enclosed arc chamber, effectually sealing same against dust and dirt.

Vacu-Break PRINCIPLE OF CIRCUIT RUPTURING

Service Shop . . . Practice . . . . . .

Under-Table Coil Bracket

By threading stator coils on "underslung" brackets near the winder's turn-table it is not necessary to take



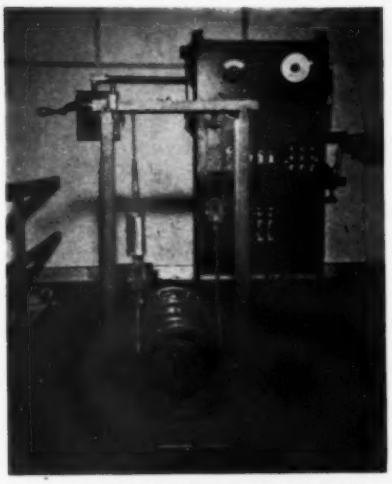
up space on top of the adjoining benches which may be needed for other work. The coils are out of the way and do not become soiled or bent out of shape. This type of bracket is in general use in the winding department of the Berger Bros. Electric Motors, Inc., at Rochester, N. Y. A piece of ½-in. by 3-in. flat iron was shaped and forged into a bracket, and then bolted to the underneath side of the various benches.

Adjustable Brake for Testing Motors

Reconditioned motors from 1 to 20 hp. are quickly tested for starting, full loads, and overloads, with an adjustable test stand that is used by the Electric Service Repair Company, Paterson, N. J. A special flanged steel pulley, which is provided with an internal chuck, is clamped upon the motor shaft and revolves against a heavy band of brake lining. The tension or pull that is thus exerted on the band is indicated upon a scale to which one end of the band is secured. The horsepower values of various scale readings have been tabulated upon a stenciled copper name plate attached to the stand, as follows:

H.P.	1800 r.p.m. lbs.	1200 r.p.m. lbs.	900 r.p.m. lbs.
1	16	19	22
2	22	28	33
3	28	37	45
5	39	53	66
7.5	55	76	96
10	70	100	120
15	90	135	180
20	120	185	245

A tension adjusting windlass or crank at the upper right is operated to tighten the brake band. This crank winds the scale chain upon a shaft which is provided with a stop latch. As a motor is run on test it may be loaded as desired by this braking method, while the instru-



ments on the testing switchboard are under observation.

The frame for this outfit is made of 1½-in. by 4-in. channel iron, 50 in. high and 24 in. wide with its uprights welded to a steel bedplate. The bedplate is slotted to receive cross-rails which are also slotted, thus providing an adjustable base for bolting down all motors within the testing capacity of this equipment. The pulley has a diameter of 13½ in. and its flanged face is 3 in. wide to accommodate the 2¾-in. wide heavy duty band of brake lining that is used. A universal chuck, which takes up to 2¼-in. shafts, is held within the pulley rim by five 1¾-in. by ½-in. steel spiders that have been welded to the rim and bolted to the chuck face with flat head machine screws. A hole was bored through the pulley face for clearing the chuck wrench.

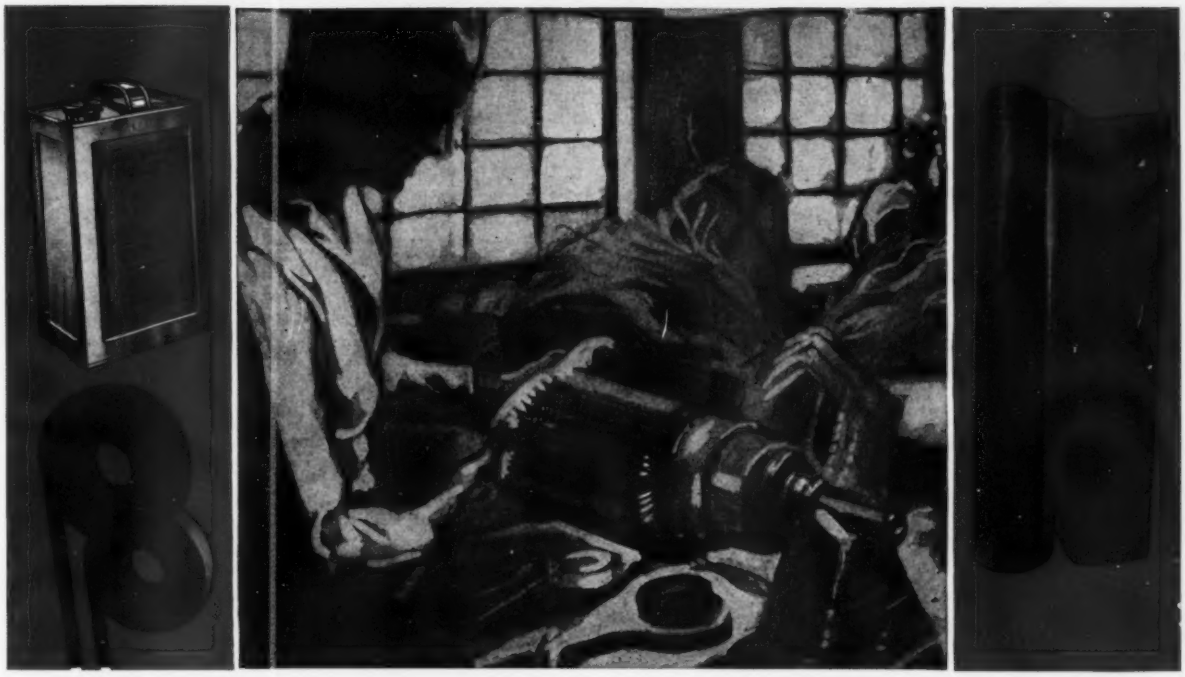
Temporary Dust Protection

The scattering of dust throughout the service shop which often results from cleaning out dirty motors has been eliminated with temporary canvas drops by the Duvall Electric Company, Albany, N. Y. Motors are air-cleaned in a corner of the shop where a built-in exhaust fan is located. Two pieces of canvas are hung from the ceiling to close off a square floor area from the balance of the shop. As the dirt is blown from the motor it is exhausted out of this room without becoming scattered throughout the shop.

Compact Brush Making Set

For cutting and beveling carbon brushes from stock slabs, McCarthy Bros. & Ford of Buffalo, N. Y., provided a space-saving layout for their equipment in a corner of the motor service shop. A twin-bearing spindle and base has two 12-in. carborundum disc saws, which are driven by a V-belted ¼-hp. motor. One saw is coarse grained for cutting heavy stock, and the other is fine grained for lighter stock. Each saw revolves through a slotted ¼- by 4-in. copper bed-plate or bracket upon which the carbon block is fed during the cut-off process. A plate glass guard covers both saws on the line of vision. A facer or beveler stand is at the left of the cutting machine which has a 10-in. carborundum face-plate wheel mounted on the shaft of a ½-hp. 870 RPM motor. An adjustable bracket or rest permits the grinding of carbon blocks at any desired angle of

GAIN CUSTOMERS BY INSTALLING
G-E INSULATING MATERIALS



General Electric Insulating Materials produce durable installations which will help to increase your business in two ways. First, your satisfied industrial and commercial customers will give you more work. Second, they'll recommend you to other firms so that you gain new customers.

G-E Friction and Rubber Tapes are made in a variety of types for every electrical requirement. Your wiremen will like these tapes because they are easy to handle. G-E Friction Tape won't dry up and curl — it really *sticks*. G-E Rubber Tape can be moulded by the heat of the hand into a solid mass, forming a watertight insulated joint. Yet G-E Tapes cost no more than ordinary tapes.

G-E No. 460 Black Baking Varnish is an excellent plastic baking varnish for general use. G-E No. 1676 Black Baking Varnish has the same general characteristics as No. 460 but possesses still greater resistance to oils and moisture, and has the ability to build films more quickly.

G-E Varnished Cloths are extremely flexible, have high dielectric and tensile strength, and will endure.

G-E Armature Wedges are sturdy. They are made of hard maple, with each stick selected for its fine grain, hardness and freedom from splitting tendency.

Get information on the complete line of G-E Insulating Materials. See your G-E Merchandise Distributor, or write Section M-682, Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.

GENERAL ELECTRIC

INSULATING MATERIALS

APPLIANCE AND MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONN.

IS YOUR BRUSH *Inventory* 2 FACED?

When your stock record reads: "50 brushes for ¼ H. P. Model X Blank Motor" . . . you're sure of the 50 but are you sure they meet the service conditions for which that motor was built?

Low specific resistance to give high torque combined with sufficient contact resistance to give good commutation is a necessary brush characteristic of the series A. C. motors used in food and drink mixers. Good commutation helps prevent excessive temperature rise.

The torque and commutating characteristics mentioned above must also be present and remain constant in the brushes for the repulsion-start motors found in refrigeration service. These brushes must stand the shocks of frequent starting and be absolutely noiseless.

Fan motor brushes must each season remove the dust and lint of winter storage from the commutator without wearing it. Tolerances on sizes must be close so the brushes won't bind in dirty holders.

One make of washing machine motor using ring brushes probably outranks all others in number of applications. Its brushes must lubricate without "gumming" and withstand the vibration and end-thrust of the driven mechanism.

The flush mica commutators of portable tool motors require carbon brushes with sufficient cleaning action to prevent "high mica" without commutator wear.

The high contact resistance resulting from glazed commutators has an adverse effect on the suction value of vacuum cleaners. It is the job of the carbon brushes to prevent any glaze from forming.

Avoid "2 Faced" Inventories by Sending for Ohio Catalog 19B and the 64 Page Booklet "The Brush Phase of Motor Maintenance." They're both free!

THE OHIO CARBON COMPANY

12508 BEREA ROAD • CLEVELAND, OHIO

bevel. Both machines are equipped with tin piping that connects to a suction blower which carries the carbon dust out of the room.

---

*Lubrication of Bearings**

Care of Ball Bearings: Dirt is particularly damaging to ball bearings and it should be kept out. Excessive grease causes heating and noise. Under normal operating conditions grease should not be added oftener than three times a year. When a ball bearing heats or is noisy let out some of the grease. Don't be afraid to take out most of the grease for the time being and simply squirt a few drops of light oil on the balls. This will usually stop the heating unless the bearing has been damaged by excessive temperature due to over greasing. The bearing housings and bearings should be washed with clean gasoline once a year and should be repacked with ball bearing grease.

Pointers on Sleeve Bearings: Most sleeve bearing oil wells are equipped with sight and level gauges to make inspection and filling easy. It is, however, not practical to provide an overflow with a larger outlet hole and still keep it reasonably tight against the entrance of dust and dirt. It therefore follows that when oil is poured in, at the top of the well, in a large stream, the inside level will be above that shown by the overflow gauge. Another point which does not occur to most oilers is that when oil is poured in at the top, the bearing, shaft and housing surfaces are covered with oil, which, when it all drains off, will increase the oil level.

Oil should never be poured into a bearing housing while the motor is running unless it is impractical to shut the motor down. Due to the action of the oil ring, which dips into the well below the bearing and carries oil to the top of the shaft, the surface of the oil in the well is not level, while the motor is running. It therefore follows that gauges show a false level. It should also be remembered that when the motor is running, the oil grooves are full and all of the surfaces are coated with oil which drains back and raises the level when the motor stops. Therefore if oil is poured in while the motor is running, the pouring should be stopped before the gauge shows that the well is full.

Over filling of sleeve bearings results in saturated windings which

*Abstracted from "Lubrication of Bearings in Electrical Machinery," by the Imperial Electric Co., Akron, Ohio.

When contractors specify and insist on the new

ELECTRUNITE Steeltubes

Electrunite Steeltubes with the knurled inside finish showed by actual test a saving of 30% in the effort required to pull cable through. The cable rides the tops of the tiny knobs instead of making contact the entire length.

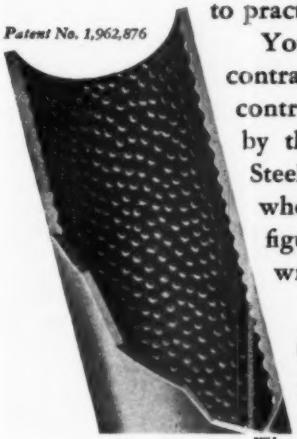
—it means more contracts, lower costs, better profits in 1936

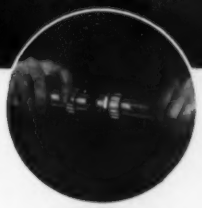
To obtain contracts in 1936, bids probably will require the same close figuring as in the past several years. And Electrunite Steeltubes is the ideal conduit for such conditions. It will help you put more figures—black figures—on your ledger.

This genuine modern electrically welded electrical metallic tubing offers many advantages not available in ordinary conduit. It is light in weight and easy to handle and install; it takes up less space in walls and floors; its knurled inside surface makes wire pulling approximately 30% easier; and with all necessary couplings and connectors, genuine Electrunite Steeltubes actually costs approximately 5 to 15% less than threaded conduit. Full electrical and mechanical protection for wiring and wide approval make it adaptable to practically every type of installation.

You can join the host of electrical contractors who are obtaining more contracts and enjoying greater profits by the use of genuine Electrunite Steeltubes. Request your electrical wholesaler to give you comparative figures, see Sweet's Catalog or write us for full information.

Patent No. 1,962,876





NO THREADS
Three simple compression-type fittings make tight, safe joints and simplify installation. No threading required.

EASY TO CUT
Tough and rigid for complete protection to wires and cables, yet cuts easily because it is made from uniform, flat, cold-rolled steel.

EASY TO BEND
Exceedingly ductile, yet tough. May be bent with ease to any desired shape, and may be straightened and rebent if necessary.

Knurled inside finish available in ½", ¾" and 1" sizes.

Electrical Division

Steel and Tubes *Inc.*

WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING

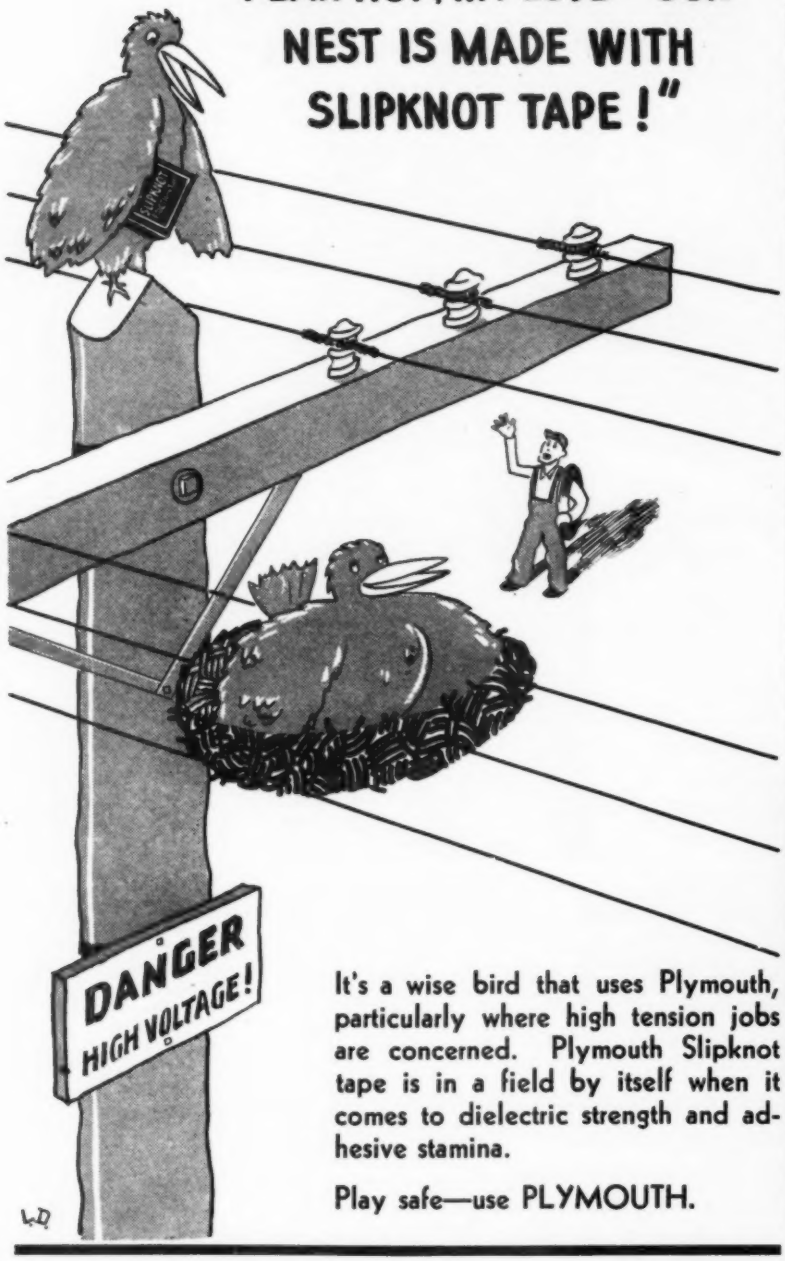
CLEVELAND . . . OHIO

SUBSIDIARY OF REPUBLIC STEEL CORPORATION

When writing Steel and Tubes, Inc. for further information, please address Department EC.

UMI

"FEAR NOT, MY LOVE – OUR NEST IS MADE WITH SLIPKNOT TAPE!"



It's a wise bird that uses Plymouth, particularly where high tension jobs are concerned. Plymouth Slipknot tape is in a field by itself when it comes to dielectric strength and adhesive stamina.

Play safe—use PLYMOUTH.

SLIPKNOT TAPE

P. R. SPLICING COMPOUND

PLYMOUTH RUBBER COMPANY, INC.

Largest Rubberizers of Cloth in the World

CANTON MASSACHUSETTS

destroys insulation and in the case of direct current machines also causes commutator troubles.

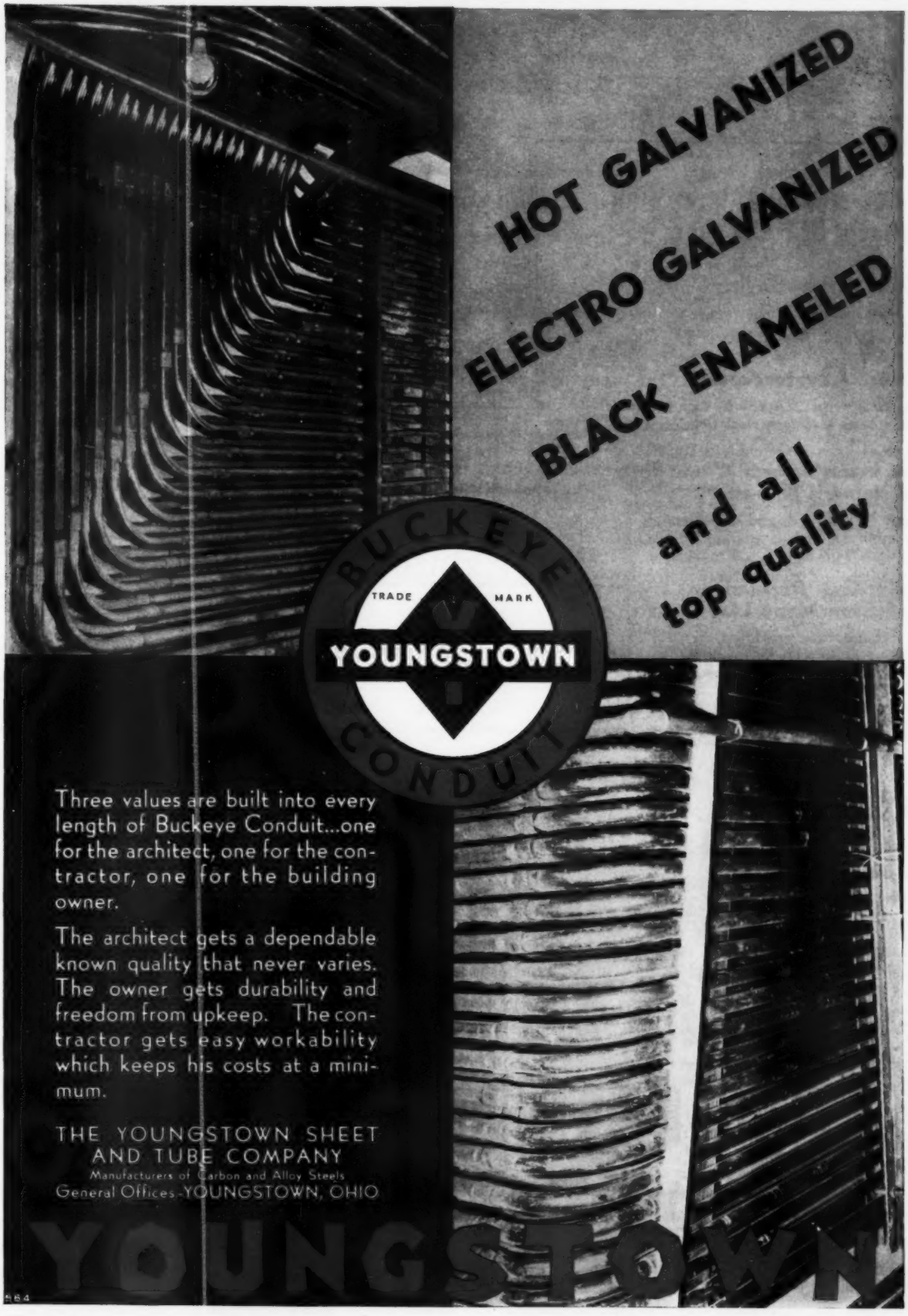
Use Quality Lubricants: In the case of both sleeve and anti-friction bearings, it pays to use lubricants of good quality. Some organizations attempt to use lubricants that are just one step above kerosene. Others use oils so stiff they will hardly flow and in many cases greases are being used in anti-friction bearing motors that are too heavy or that contain rosin, acid, or alkali hardeners. Fiber and graphite greases are not suitable for ball bearing lubrication.

Accurate records covering a period of years in the plant of one large manufacturer which operates many thousands of motors show that 92 per cent of all motor failures are directly or indirectly traceable to bearing troubles. It therefore follows that the effective maintenance of electric motors is largely the problem of bearing maintenance.

Out-of-the-Way Spool Racks

The pay-out racks for spools of magnet wire are mounted on the second floor, while the tension device and winding machine are on the first

floor in the compact shop of Francis Pautz, Elmira, N. Y. The wires are fed down through the floor through short pieces of rubber hose to an idler spool that is placed at the back of a pedestal-mounted tension device. When small spools of fine wire are used for winding magnet coils, etc., they are hung at the first floor ceiling from a stirrup bracket which supports the payout spindle. This out-of-the-way method of unwinding magnet wire allows the storage of all heavy spools upstairs.


HOT GALVANIZED
ELECTRO GALVANIZED
BLACK ENAMELED
and all top quality
BUCKEYE
TRADE
MARK
YOUNGSTOWN
CONDUIT
Three values are built into every length of Buckeye Conduit...one for the architect, one for the contractor, one for the building owner.
The architect gets a dependable known quality that never varies. The owner gets durability and freedom from upkeep. The contractor gets easy workability which keeps his costs at a minimum.
THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices-YOUNGSTOWN, OHIO
YOUNGSTOWN

YOUR BUYERS REFERENCE NUMBER WILL

SAVE YOU TIME AND MONEY

322 pages of valuable buying data that will help you:

- **Save Time When Buying**
  Products, trade names, manufacturers and other buying data, cross-indexed for easy reference.
- **Buy More Advantageously**
  Gives you *all* the manufacturers of each product and, in many cases, details on their lines.
- **Locate Manufacturer When Only Trade Name is Known**
  Trade names are indexed, and manufacturers' names and addresses given.
- **Quickly Get Detailed Information on Many Lines**
  194 manufacturers have amplified their listings with advertising giving specifications on their products and, in some cases, complete catalogs.

Keep your copy handy!

Tabulated Buying Data

Exhibit Section — Lists of Sales Offices, Locations of Warehouses

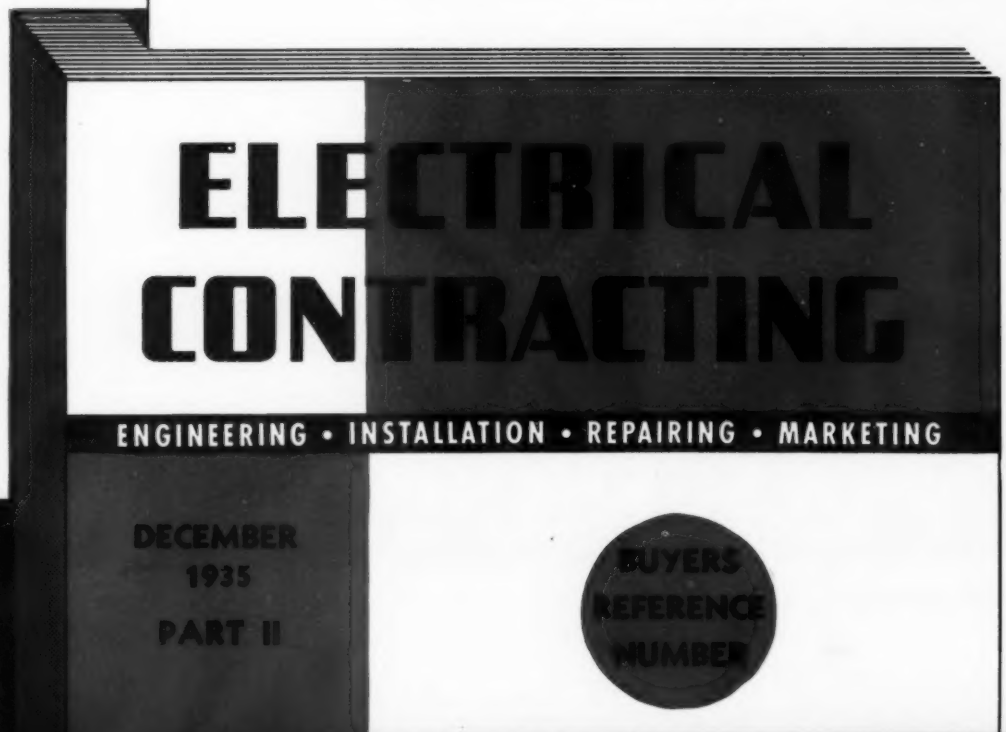
Company Name and Trade Name Index

Company Names and Trade Names listed in the Classified Directory Section arranged alphabetically

Directory of Manufacturers Classified

With Company Names, Addresses and Trade Names

ELECTRICAL CONTRACTING
330 West 42nd St.
New York, N. Y.



The Buyers Reference Number, published as Part II of ELECTRICAL CONTRACTING for December 1935, is substantially bound as a separate book for use during 1936.

Code Chats . . . . .

Questions and answers relating to the interpretation of the National Electrical Code . . .

Conducted by F. N. M. Squires

Chief Inspector New York Board of Fire Underwriters

Determining Size of Service Wires

Service conductors according to 404-f shall not be smaller than No. 8, except that when a single branch is used they could be No. 12. 405-a—Exception 2 states that they shall be determined by table in 612 and Section 2002. How is this done?

The Code requires that the demand (load) be computed from Section 2002 and then that the wire size for that load be determined by reference to Section 612, but that no service be smaller than No. 8 with the exception to this requirement that for a single branch circuit job No. 12 wires may be used for the service.

Small Motor Protection

According to 808-c-Exception 1, motors of ½ to 1 hp. which are started automatically, unless provided with inherent overheating protection shall have the running protection required by rule c modified to allow protection at 140 per cent of the rated current of motor.

What is considered automatically started?

Where the starting of a motor is not accomplished by a manual action it is considered automatic. Examples of this are the domestic refrigerators and oil burner motors.

What is the meaning of "unless provided with inherent overheating protection' ?

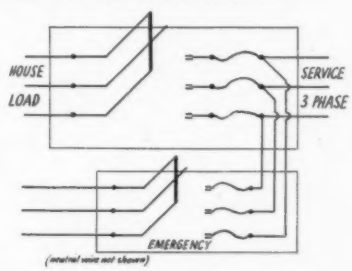
The inherent overheating protective device is one which is built into the motor frame and is actuated by the heating of the motor frame to interrupt the current supply when the heat becomes excessive.

Does the last part mean that rule c shall be modified so motors of ½ and 1 hp. shall be allowed a running protection of 140 per cent of motor full-load current?

Motors of ½ to 1 hp. with the inherent overheating protection may be protected by the circuit fuses which often are far in excess of 125 per cent of the motor rating. But motors not having this inherent overheating protection must have fuse or circuit breaker protection at not over 140 per cent of the motor rating. Many small motors will not start at this low percentage of their rating.

Emergency Lighting Hookup

Please show by diagram how 407-b-Exception 2 is done. "Circuits for emergency illumination may be connected on the supply side of the service fuses if separately provided with over-current protection."



Fuse Size for Motor Feed

In a recent power installation there was installed a feeder consisting of three No. 6 wires in a 1¼-in. conduit to a pent house of an elevator for future use. This feeder was supplied from a 100-amp. switch in a power cabinet. It is intended later to install a 5-hp. motor for an elevator with a suitable sized fused switch located at the end of above feeder to protect the motor.

What is the largest size fuse that can be installed in the power panel to protect the No. 6 wire?

Assuming the motor to be 3-phase, the 5 hp., according to the Code, has a full load rating of 15 amp. Referring to Table 1, the maximum allowable rating of the branch circuit fuses would be 45 amp. for a full voltage resistor and reactance starting motor and 40 amp. for an autotransformer starting motor.

The fact that No. 6 wires are used does not change the requirement as to the size of the fuses in this case. Their size is determined by the motor.

The No. 6 wires could be used to feed a 15-hp., 220-volt, 3-phase motor, in which case the fuses at the supply end of this circuit could be 125 or 80 amp. depending on the type of starting equipment.

Had the No. 6 wires been used to supply a lighting panel the largest fuses which could be used would be, of course, 50 amp.

Location of Service Fuse

Does 406-b mean that the service fuse must be located wherever the service switch is, or would it allow the fuse to be located at one end of the service conductors, and the switch at the other?

In general the service fuse and the service switch should be located at the same location as the service switch, that is, at the readily accessible point nearest to the entrance of the conductors either inside or outside of the building wall.

The fuse, however, may be located at the outer end of the service conduit. But the Code does not provide for the placing of the service switch at the outer end of the service conduit when the fuse is at the load end.

Sealing Conduit to Prevent Condensation

How is the requirement of 500-n to prevent conduit breathing accomplished?

This is accomplished by caulking the conduit around the conductors such as by means of oakum or sealing with compound.

Wire Space in Conduit Fittings

The Code rules on outlet boxes require, in general, that boxes have at least 2 cu.in. free space within the box for each No. 14 wire run into the box.

It does not appear to me that there is sufficient space in condulets to afford the 2 cu.in. for each wire. How about it?

Our correspondent evidently failed to notice the fine print note under the table in rule 512-o (page 71, 1935 Code) which advises that the limita-

ELIMINATE DANGER!

In All Hazardous Locations

INSTALL APPLETON EXPLOSION-PROOF UNILETS

• In any location where explosive gas or dust is present, Appleton Explosion-Proof Unilets protect lives and property by removing one cause of detonation. Unilets meet the requirements of the Underwriters' Laboratories for use in hazardous locations and have proven their effectiveness in exhaustive tests and under actual working conditions. Their use results in lowered insurance rates.

Type "EVA" Explosion-Proof Lighting Fixture (100 and 200-Watt)
Type "HMSC" Explosion-Proof Motor Starter (Local Control)
Type "CPSIC" Unilet Complete with Lift Cover (Closed)
Type "EFSC" Motor Control Push Button Station
MDS Series Explosion-Proof Unilets

Made of malleable iron, their sturdiness gives thorough protection and the Cadmium finish resists rust. Write for Bulletin 1003 for information on wiring in hazardous locations. Note all types of Explosion-Proof Unilets that are now available.

Sold Through Wholesalers

APPLETON ELECTRIC COMPANY

1704 Wellington Ave., Chicago, U.S.A.

NEW YORK—76 Ninth Avenue
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ST. LOUIS—420 Frisco Building

APPLETON *Explosion-Proof* UNILETS

Reg. U. S. Pat. Off.

tions are not intended to apply to types of boxes or fittings without knockouts and having hubs or recessed ports for terminal bushings and locknuts.

It must be remembered that while in ordinary pressed steel boxes considerable space is occupied by the locknuts, ends of connectors or clamping devices, the interior of the conduit fitting is all free air space. Also, in the ordinary type of box there are some six to twelve knockouts with a possibility of them all being used, while in the conduit fittings there are generally but two, three, or four openings in by far the largest majority used in general practice.

Flush Switches Must Be Enclosed

If I am called to install switches in a house and upon installation I encounter no grounding bars or stud boxes on wall, do I have to install the bars (bar grounding) or change the stud boxes, for gem boxes in order to receive a certificate?

It is not clear as to just what our correspondent has in mind about the "grounding bars."

However, the flush type of wall switch must be installed in an enclosing box such as is generally known as the "gem" box.

A switch could not, of course, be installed in a "stud" box as the shape and size of the box would not permit it.

On an armored cable or conduit job the box would be grounded. Where the box is not grounded the switch (or receptacle) plate must be of insulating material.

Cold Solders

Is it permissible to use some of the preparations on the market called "Cold Solder," "Liquid Solder," and similar material for the same purpose as ordinary solder, that is, instead of the alcohol torch and paste and strip solder.

Rule 203-a says, in part, "The joints (splices) shall be soldered with a fusible metal or alloy unless made with a splicing device * * *"

There are on the market so-called "solders" which contain but very little metal and which are not good conductive materials. These must not be confused with the solder which requires heat.

Inspectors will require the old-fashioned solder on all splices and will not approve any of the cold solders which often are very good insulators.

H & H
CUTOUTS
In styles and sizes regularly needed, for Cartridge
or Plug Fuses — Solid or Fused Neutral.
HART & HEGEMAN DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

UMI

ELECTRICAL CONTRACTING

S. B. WILLIAMS, Editor

Must Rewire

CONSIDERABLE criticism of the Better Light-Better Sight activities has been voiced by members of the Building Owners and Managers Association. They state that their tenants are asking for more illumination, and that there is little they can do without rewiring.

Those buildings never were adequately wired to begin with. In all probability the electrical job was chiseled down until it was a headache to the electrical contractor. The tenants need better light and should demand it. Our job now is to follow up with plans for wiring modernization.

More power to the Better Light-Better Sight campaign—full steam ahead.

—◇—

Safety Education

IT IS appalling sometimes to think how many people are content to let a few carry the load. In the matter of public education on electrical safety, for instance, every power company, manufacturer, wholesaler, dealer and contractor is benefited by this education, yet the actual work is carried on by only a small handful of interested people while the money comes from a single group —the cord manufacturers.

Public education is not something that can be done for a few months and then dropped. It accumulates in size like a snow ball. Day in and day out plugging is necessary for success.

Do we want safer wiring, better inspection, less bootlegging, fewer fuse and circuit failures, better operation from appliances and light? If we as an industry are willing to spend thousands of dollars for committee meetings to perfect a National Electrical Code, if we are willing in hundreds of cities to work for months to secure a suitable wiring code, do we not want to protect these investments?

To permit one group to carry all of the load is unsafe, because that group, by stopping any time it wants to, can stop the entire activity. We must not sit by as one of a vast audience watching a show. This party belongs to the industry, and it needs active, loyal workers. It needs widespread support.

—◇—

Salesmen Needed

A COMMON criticism of the electrical contractor is that he is not a salesman. Should he be one?

Everyone knows that there are some contractors who are salesmen and others who are not. It is equally true that those who sell have a better business than those who do not.

Is a manufacturer a salesman? Is a publisher or a public utility or any one of a number of different business enterprises a salesman? Obviously a storekeeper is and must be a salesman because his business is to sell, but these other businesses are ones of making a product or furnishing a service. In that respect they are similar to the electrical contractor. They have devoted their energies to making a product or furnishing a service and then have employed someone else to sell their wares. And that is where the contractor has fallen down. He has tried to both fabricate and sell instead of employing someone to do the selling.

Unfortunately, in many instances where he has employed a salesman it has been an estimator. Because an estimator's approach to a job is from the angle of costs, he is more apt to buy a job than to sell.

The smaller contractor, on the other hand, does not feel that he can afford to hire a salesman because of the expense. If a salesman did nothing more than sell in competition with some other contractor on the basis of price, then he would be just another liability. Unfortunately, the profitable sales building type of salesman has not been available to the electrical contractor.

Everything we know points to the fact that there is a tremendous amount of untouched business available. The industry has discussed almost every way to get it, except good old-fashioned selling.

In the field of reinspection alone a good sales-

man could at 10 per cent commission make a fine living for himself and build a large volume of non-competitive business for his employer. After hearing what has been accomplished by inspectors in some cities, we do not know why they haven't sold that idea to some contractor. They could probably make twice as much selling reinspection for a contractor as they make as inspectors.

If the electrical contractor is not a good salesman, is it enough to criticize or shouldn't something be done to correct the situation? The contractor would welcome a type of business where he did not everlastingly have to sharpen his pencil.

Why not make trained salesmen available for him? Why not study the markets at hand and determine the customer needs and the proper approach? Why not train men to tap these markets and turn them over to contractors on a fixed percentage basis?

Sooner or later someone has got to do this selling and someone must pay the price. Why wait and then do it in a roundabout way, turning work over to some contractors? Why not start right and let the contractor stand on his own two feet, enjoying his business that his own sales force brings in?

The need for a national study of selling is indicated as well as a sales manual and a training course. When that is done and salesmen become available, a subsidy may be needed until the men begin to pay their way. That, however, should not stand in the way, because if the industry does its job properly of finding out how to sell, the trained salesmen will not take long to pay their own way.

Simple Accounting

FOR a great many years there has been available the Standard Accounting System for Electrical Contractors, but it has been too cumbersome for the average contractor to use. A simpler system has been needed to take care of the smaller businesses. Such a system has been devised by the National Electrical Contractors Association, and is described in this issue.

Because of its simplicity, and the fact that all of the operations of the business may be seen at a glance, it is hoped that many thousands of this system may be placed in operation. Not only will those using the system benefit, but it will be possible then to secure comparable data on the cost of doing business from a large group of contractors. Such figures will be of real service to the members of the industry.

By having all of the data kept on two facing pages, it is going to be easier to effectively control operations, make out income tax reports, check up tax returns, discuss loans at the bank, gauge profits and make important decisions quickly.

Rewire America

A committee has been appointed by NEMA to consider ways and means for engaging in a campaign to Rewire America. As a market it offers enormous possibilities, but it must be sold—sold first to the industry, and then to the pubulic.

The public has said repeatedly that it does not want any more wiring, but students of the market know that the public needs more wiring. The big job ahead of those planning a means for uncorking the rewiring market is first to determine the need in terms of the customer, and then to find a practical sales approach.

Relief Labor

With New York City as a sort of testing ground. WPA is trying to find out how to return men on relief to industry. Employers who advise WPA when any additional help is needed, whether permanent or temporary, will be sent men qualified by experience. Such men, if accepted, will be taken off relief only so long as they are employed. In that way it is expected that men can accept temporary employment without the fear of no income once the job is finished.

Among the trades being approached in this connection are the electrical contractors. They frequently need extra men and, in the case of non-union shops, where the employment of relief mechanics would apply, it is not always easy to find good men quickly. If WPA is able to supply competent electrical workers upon demand, it should be most helpful to both sides.

It must be remembered, however, that the electrical contractor is not going to be satisfied with poor workmen. For that reason the New York experiment will be watched by other cities.

N.E.C.A. News..

Material for this department is supplied by the headquarters staff of the

National Electrical Contractors Association

420 Lexington Avenue, New York, N. Y.

President	Vice President	General Manager
E. N. Peak	Louis Kalischer	Laurence W. Davis
1603 West Main St.	17 Bergen St.	420 Lexington Avenue
Marshalltown, Ia.	Brooklyn, N. Y.	New York, N. Y.

N.E.C.A. Representatives on Industry Promotion Committee

At the organization meeting of the Electrical Industry Promotion Committee held at the Hotel Commodore, New York City, on January 7, Earl N. Peak, president, N.E.C.A., was unanimously elected as permanent chairman of the committee, and C. E. Greenwood, commercial director, E.E.I., was elected secretary. The N.E.C.A. official representatives on the Electrical Industry Promotion Committee are Mr. Peak, Robert W. McChesney, Washington, D. C., and Ralph M. Walker, chairman of N.E.C.A. Distribution Committee, Atlanta, Ga.

Executive Committee to Meet in March

A change in the time and place for the next meeting of the Executive Committee of the N.E.C.A. has been announced, the meeting to be held at the Hotel LaSalle, Chicago, Ill., on March 24, 25 and 26.

This change from the original plan to meet in St. Louis in April has resulted from the arrangements made for holding the next meeting of the Electrical Industry Promotion Committee at the Edgewater Beach Hotel in Chicago on March 23 at which several members of the N.E.C.A. Executive Committee will be in attendance.

Cost Data Committee Revising Estimating Manual

George W. Patterson, Eastern Canadian Division executive committeeman, Toronto, Ontario, who is chairman of the N.E.C.A. Cost Data Committee, has invited the following electrical contractors to serve as members of his committee:

C. A. Rowley, Pasadena, Cal.; Chas. A. Langlais, San Francisco, Cal.; J. J. Agutter, Seattle, Wash.; Alfred J. Hixon, Boston, Mass.; J. M. Whalen, St. Paul, Minn.; Arthur S. Henry, New York City; K. D. White, Columbus, Ga.; R. H. Bouligny, Charlotte, N. C.; D. B. Clayton, Birmingham, Ala.; J. H. Schumacher, Winnipeg, Manitoba; J. Walter Collins, Chicago, Ill.

The Cost Data Committee is undertaking a revision of the N.E.C.A. estimating data and the preparation of a new estimating manual in a practical and ready-reference form for electrical estimators.

The Cost Data Committee invites the cooperation of all electrical contractors in submitting additional tables or revisions to the present estimating data which they have developed from their field experience. Any suggestions or recommendations should be addressed to the chairman of the committee, George W. Patterson, 9 Richmond Street East, Toronto, Ontario, Canada.

Survey of Wage Rates Completed

The N.E.C.A. has just published and distributed to all members of the Association a Survey of Wage Rates for 1017 cities and towns in the United States, showing the prevailing wages paid to journeymen and helpers in both the open shops and union shops in the majority of these places. This survey covers a greater number of cities and towns than any previous compilation and is of especial value to every electrical contractor today who is called upon to figure on work in any locality outside of his own city.

Committee on Legislation

Robert W. McChesney, chairman of the N.E.C.A. Committee on Legislation, has appointed to his committee a representative electrical contractor in each of the state capitals throughout the country.

It is the purpose of this committee to keep advised of all matters of legislation (proposed, pending or existing), affecting the membership of the N.E.C.A. and to make recommendations to the Executive Committee regarding such legislation.

All electrical contractors are invited to submit to the N.E.C.A. Committee on Legislation any laws which come to their attention which they believe should receive consideration by the N.E.C.A. and to give the committee their suggestions and recommendations. The committee particularly invites the submitting of license laws governing electrical contractors, either existing or proposed, as well as statutes providing for lien laws, separate letting of contracts for electrical work and other legislation affecting the industry.

Itinerary for President Peak's Western Trip

President Earl N. Peak has found it necessary to postpone for sixty days his proposed trip which is planned to cover thirteen states west of the Mississippi. The itinerary for this trip has now been definitely announced and arrangements are being made for the holding of both electrical contractors' and industry meetings in each of the following cities:

Kansas City, Mo., April 6
Tulsa, Okla., April 7
Oklahoma City, Okla., April 8
Fort Worth, Tex., April 9
Dallas, Tex., April 10, 11
Houston, Tex., April 12, 13
San Antonio, Tex., April 14, 15
El Paso, Tex., April 16
Phoenix, Ariz., April 17
Los Angeles, Cal., including San Diego, Santa Barbara, Long Beach, etc., April 19 to 23
Fresno, Calif., April 24
San Francisco, Cal., Northern California group meetings, April 26 to May 1
Portland, Ore., Oregon group meetings, May 3 to 6
Seattle and Tacoma, Wash., May 7 to 9
Spokane, Wash., May 11
Boise, Idaho, May 12
Pocatello, Idaho, May 14
Salt Lake City, Utah, May 15, 16
Denver, Colo., May 18, 19
Omaha, Nebr., May 20

P.W.A. Ruling on Deductions from Wages

In response to inquiries regarding P.W.A. regulations requiring contractors to fill out and sign affidavit to the effect that "the payroll on the reverse side hereof is a true and accurate report of the full weekly wages due and paid to each person employed by the said employer of the construction," the N.E.C.A. has secured the following ruling from Horatio B. Hackett, assistant administrator, Public Works Administration, Washington, D. C.:

"The requirement that no deductions be made from wages does not preclude deductions made mandatory by state laws as contributions to Employees' Compensation or Insurance Funds, and authenticated notation of such deductions on the pay roll and affidavit is entirely in keeping with the intent of our regulations. If any regulations are issued changing the form of the

A PRODUCT IS KNOWN *by the* COMPANY IT KEEPS

Progressive companies in many fields are now wrapping and sealing their products in Cellophane, but in each field there has been one pioneer to lead the way. Panther and Dragon were the first commercial tapes to adopt this protective sheathing, a step in keeping with their policy of leadership—a leadership extending from the superior qualities of the tape itself to the Modern way of packaging and merchandising. A product is known by the company it keeps, and dealers and jobbers everywhere know that it pays to stock a leader.

HAZARD INSULATED WIRE WORKS

Division of

THE OKONITE COMPANY

Factories: Wilkes-Barre, Pa. Passaic, N. J.

UMI

FLOOR BOXES & WIRING SPECIALTIES

Sectional view of No. 295 Nozzle showing brass armored attachment Plug.

Showing the No. 295 Nozzle Mounted on Cover of No. 130 Adjustable Floor Box.

INCREASED PROFITS WITH FULLMAN

Fullman's quality line of floor boxes and wiring specialties can save you money because they are

1—Easy to install
2—Reasonably priced
3—Properly designed and constructed to insure perfect operation

Write for catalog; or see your wholesaler.

No. 9420 Split Insulator attached to No. 402 Insulator Support with 2¾"x.4" No. 18 Machine Screw.

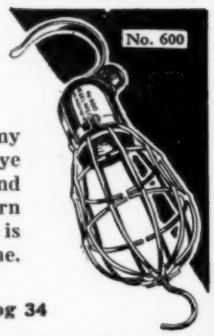
NO. 330 LATROBE TOM THUMB UTILITY OUTLET
For use in wood installations, and other locations free from moisture or mechanical injury.

"Latrobe" FLOOR BOXES

FULLMAN MFG. CO. LATROBE PENN.

Lamp Guards by McGILL

No. 1400



No. 600

Lamp Guards prove to be an economy by saving breakage, theft, relieving eye strain, reducing accidents, spoilage and increasing production. Every concern can use them. Profitable sales volume is possible with the complete McGill Line.

A Type for Every Requirement—Send for Catalog 34

The Loxon—has the lock feature—stopping theft. Made with or without reflectors, for regular or Mill Type lamps.

Rubber Handle Portables—a line of portables with ten unusual selling features. Users like them.

Bulldog—strong, sturdy, copper plated cage rigidly fitted to hardwood handle, with Lever or Keyless socket.

Crescent—a light, strong guard, made of steel rods fastened to metal ring, and without socket.

Crescent Tubular—an ideal slender guard, 2-inch diameter, for tubular lamp.

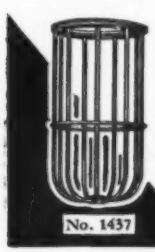
Hook Handle Portables—have many new patented features. 12 types. Take regular or rough service lamps.

Dreadnaught—a super-strong type of portable, with weatherproof composition keyless socket, wood handle.

National Portable—medium priced line—open cage with or without reflectors.

Crescent Wall Guards—ideal for warehouses, freight sheds, cellarways, factories, marine work, etc.

Gripon and Slipon Guards—stationary type—made for regular or Mill Type lamps—priced to sell readily.



No. 1437

Safety Vaporproof—useful around gases or inflammable materials. Heavy steel frame.

Protector "O"—a low cost, open bottom, heavily tinned stationary guard, for 25-60 lamps.

McGILL MANUFACTURING CO.
Electrical Specialties of Quality
ESTABLISHED 1904
VALPARAISO · INDIANA
Box No. 670

No. 1429

present affidavit, you will be informed promptly."

Joint Committee With I.A.E.I.

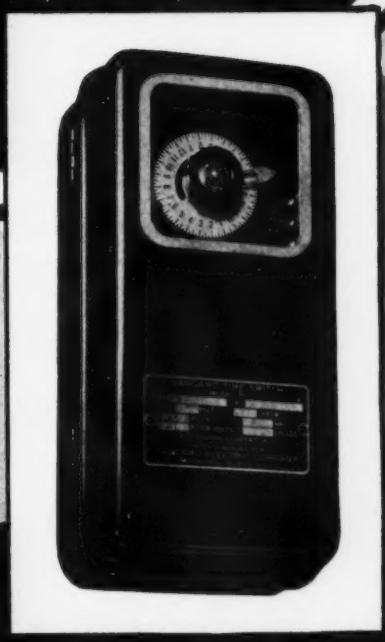
Louis Kalischer, chairman, N.E.C.A. joint committee with the International Association of Electrical Inspectors, has appointed George Andrae of Milwaukee, and J. Walter Collins of Chicago, as members of his committee to work with a similar committee of the I.A.E.I. on matters of mutual interest to electrical contractors and inspectors. The first meeting of this committee will be held in Chicago during the week of the Electrical Committee, N.F.P.A., meeting in that city in March.

New Simplified Business Record Ready

The new Simplified Business Record System developed by the N.E.C.A. for the smaller and medium sized electrical contracting businesses is now being distributed from the national headquarters. This new system, which is described in detail in ELECTRICAL CONTRACTING this month, is available upon request without charge to all members of the N.E.C.A. whose current dues are paid up and will be given free to all applicants accepted for membership in the N.E.C.A.

NEW MERCURY VAPOR LIGHTING: An installation of high intensity mercury vapor outdoor floodlights for a new super-service station at East Orange, N. J., has recently been completed by the Shaw Electric Co., Newark, N. J., marking one of the first large-scale uses of this new light source for outdoor commercial purposes. William A. Shaw was snapped while overseeing the finishing touches of this station, which is claimed to be the second largest of its type on the Atlantic seaboard. The wiring details were particularly important to Mr. Shaw, because he is the commissioner of parks and public property in his nearby home city, Montclair, N. J.

The swing is to SANGAMO



Form VS—Self-starting Synchronous Motor. Equipped with omitting device for eliminating any day or days—for controlling sign and window lighting.

Every year more and more electrical contractors are turning to the precision built quality of Sangamo Time Switches for the dependable, trouble free performance that ensures customers' satisfaction and will not dissipate their profits in endless service requirements.

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS

UMI

Contracting .... News .....

Mountain States to Promote Adequate Wiring

Adequate wiring will be sold to the public of the Rocky Mountain region during the next twelve months through a coordinated drive by all of the electrical interests in those states. Sponsored jointly by the Electrical League of Colorado and the Rocky Mountain Electrical Association, every branch of the industry will have a definite part in the promotional program.

The program includes the featuring of adequate wiring in all advertising and printed matter, as well as in radio advertising by members; education of all employees, with sales people bringing adequacy to the attention of every customer; advertising by bills and broadsides; talks before meetings both of the industry and the public.

By the combined effort of all engaged in the industry over a period of a year, it is hoped to build up a large public demand for adequate wiring, as well as educate the members of the industry itself.

Reconditioned Motor Certification

Certification of reconditioned motors, in order to establish definite standards for such equipment, has been set up by the Electric Motor Specialists Association of Southern California under a plan which has now been operating for several months.

A certificate is issued to each member who agrees to the conditions set forth for the use of a special decalcamania label which is affixed to the reconditioned equipment. The main certificate entitles the member to affix to electrical equipment altered, repaired or reconditioned the standard label of the association provided that for each label thus affixed the member offers upon delivery to the customer a written guarantee for the equipment. Each dealer is given a certificate number which is also printed on the decalcamania together with the name of the firm.

A further feature is a guarantee tag which is affixed to the equipment. On one side advice is printed as to keeping equipment properly fused and lubricated and using it only with proper current supply, type, voltage and frequency. On the other side of the tag is the guarantee against defects in accordance with the terms and conditions of guarantee of the original manufacturer. A written guarantee is also provided by each member on his own individual stationery, but in a form approved by the association.

Hartford Contractors Oppose Unfair Competition

The Hartford (Conn.) Electrical Contractors Association, comprising about forty-five members who operate in that city and nearby towns, has as its program for 1936 the elimination of unfair competition; cooperation with inspectors in reinspections and the observance of wiring standards; cooperation with wholesalers and power companies to advance any movement that is for the benefit of the public and the industry; renew state-wide efforts to secure state licensing legislation; and to support the industry's electric kitchen campaign. According to Arthur Gaskell, president, the membership is showing a lively interest in its affairs. Other officers for 1936 are: Larry LaHain, vice-president; Vincent Zukowski, secretary; Jerry Cook, financial secretary; James Gordon, treasurer, and John C. Williams, chairman of the executive committee.

$100,000,000 Annually Proposed for Farm Wiring

Similar bills placing the rural electrification activities of the federal government upon a permanent basis, and authorizing the annual expenditure over a ten-year period of $100,000,000 for this purpose, have been introduced into both houses of Congress by Senator George W. Norris of Nebraska and Representative Sam Rayburn of Texas.

The purpose is to promote the extension of electric light and power service into unserved rural areas by making 3 per cent loans to be amortized over a forty-year period to local governmental units, farm cooperatives and non-profit organizations, but not to privately-owned utility companies, to finance the construction and operation of generating plants, transmission lines and distribution systems.

Government financing of house wiring and appliance sales, both electrical and plumbing, along the rural lines is also authorized from the fund. Such loans can be made to the project sponsors, to suppliers or contractors and to individual consumers.

Iowa Association Discusses Farm Wiring

Rural electrification was the keynote of the two-day convention of the Iowa Association of Electrical Contractors held at Des Moines, January 13 and 14. Earl N. Peak, president of the National Electrical Contractors Association, outlined the farm electrification program and the part being played by the N.E.C.A. in promoting the contractors' interests in this work. The convention voted to cooperate with the national Association in the promotion of this program.

Victor Thomas, Des Moines, was elected president; Harry Ryan, Sioux City, vice-president, and Harry Bierman, Des Moines, secretary-treasurer.

Leagues Form Own Association

The International Association of Electrical Leagues was organized at a meeting of league managers held on January 18 at the Washington Electric Institute headquarters. J. E. North, Cleveland, was elected president; Ralph Newmuller, New York, vice-president; A. A. Gray, Chicago, treasurer; O. C. Small of NEMA, secretary, and E. M. Rice of NEMA, assistant secretary.

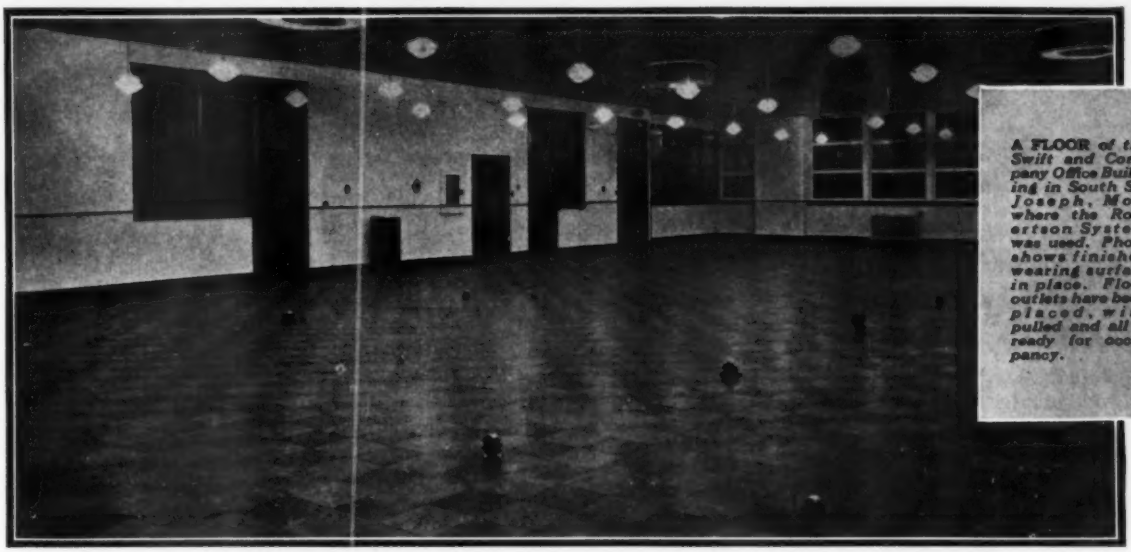
The association will be governed by a board of governors of one from each of the four geographic divisions of the United States, one from Canada and four at large. All members of the board must be full-time paid executives of a member league.

Sixteen leagues were represented at the organization meeting by delegates and eight by proxy.

Bierwagen Again Heads Ontario Contractors

At the annual convention of the Ontario Electrical Contractors Association held on January 16 and 17 at the King Edward Hotel, Toronto, R. W. Bierwagen of Kitchener was reelected president. Other officers elected were: James Turvy, Brantford, first vice-president; Balter Bennie, Hamilton, second vice-president, and John Schetzke, Kitchener, secretary-treasurer.

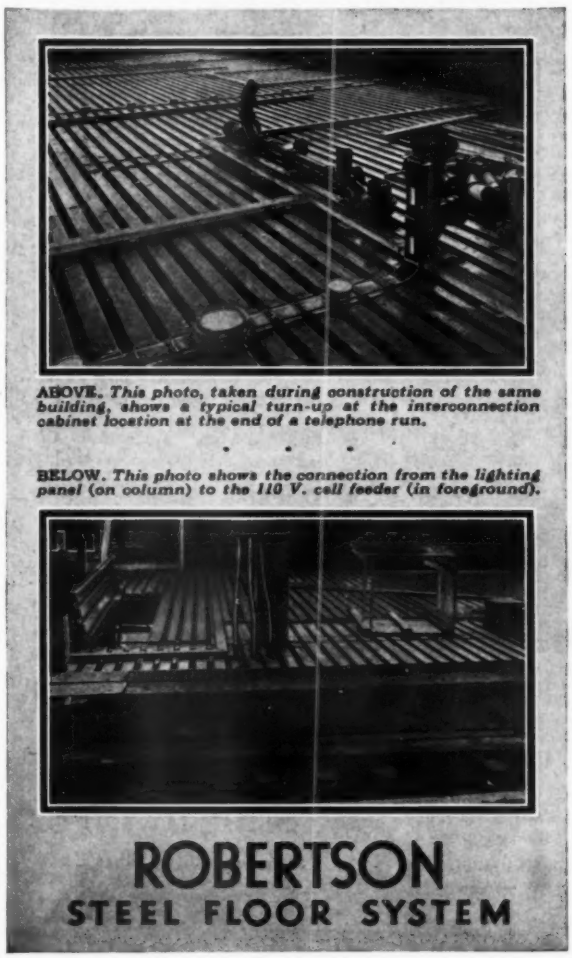
George Patterson, member of the



A FLOOR of the Swift and Company Office Building in South St. Joseph, Mo., where the Robertson System was used. Photo shows finished wearing surface in place. Floor outlets have been placed, wire pulled and all is ready for occupancy.

GIVE YOUR CUSTOMERS BETTER ELECTRICAL FACILITIES . . . WITH

The Robertson Steel Floor System



ABOVE. *This photo, taken during construction of the same building, shows a typical turn-up at the interconnection cabinet location at the end of a telephone run.*

* * *

BELOW. *This photo shows the connection from the lighting panel (on column) to the 110 V. cell feeder (in foreground).*

ROBERTSON
STEEL FLOOR SYSTEM

GOOD SERVICE to your customer demands that you give him the type of electrical job that will react most to his advantage. If you use the Robertson Steel Floor System for building electrification, you will be doing exactly that. For your customers' future profits depend upon the rentability of his building, the satisfaction of his tenants. And the Robertson Floor assures him of both in a degree impossible for other floor systems to attain.

The Robertson Floor, made up of strong, hollow, parallel steel cells, six inches apart, is in reality a comprehensive system of protected wire raceways. It affords complete electrical availability for any and all electrical needs which your customer's tenants may ever face. And its use effects substantial structural savings for your customer in the total building cost.

Incidentally, the use of the Robertson System usually results in a bigger electrical contract for you, due to more detailed installation. So by using this System, you best serve the interests both of your customer and yourself. Let us send you our brochure "New Life for Buildings" and our special technical bulletin giving complete details. Write for free copies to H. H. Robertson Company, 2003 Grant Building, Pittsburgh, Pa.

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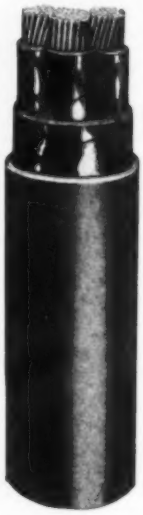
Crescent Wire

47 YEARS

OF KNOWING HOW in every foot of

CRESCENT WIRE and CABLE



Varnished Cambric Lead Encased POWER CABLE

ARMORED CABLE
APPLIANCE CORDS
BUILDING WIRE—All Types
CONTROL CABLES—Braided and Lead
FLAMEPROOF WIRE & CABLE
FLEXIBLE CORDS & CABLES
FLEXIBLE STEEL CONDUIT
LEAD-COVERED WIRES & CABLES
NON-METALLIC SHEATHED CABLE
PARKWAY CABLES
POWER CABLE
RUBBER INSULATED WIRE & CABLE
SERVICE ENTRANCE CABLES
SIGNAL CABLES
VARNISHED CAMBRIC CABLES

And all kinds of special cables to meet A.S.T.M., A.R.A., I.P.C.E.A., and all railroad, government, and utility companies' specifications.

CRESCENT
Insulated Wire & Cable Co., Inc.
Trenton, N. J.

N.E.C.A. Executive Committee, representing Eastern Canada, spoke on the needs of the average contractor, listing four things that the industry can help him with as follows:

1. Give him (the contractor) the proper tools for estimating, meaning correct manuals with the average labor units compiled by men who have had a vast amount of experience on all types of jobs.

2. Show him how to properly lay out and visualize a complete job, take off quantities in the right manner and extend them, including all items of direct job costs.

3. Provide him with a proper business record, simple and concise, but adequate so that he will know and not guess what his business involves in materials, labor and job costs.

4. Provide him with a continuous information on how jobs are being done elsewhere.

Other important addresses on the program were "Electrical Code Interpretation and the Contractor," by W. P. Dobson, chief testing engineer, Hydro-Electric Power Commission of Ontario, and "The Industrial Standards Act—Some Developments," by John F. Marsh, Deputy-Minister of Labor.

Association Offers Reward as Sabotage Protection

Because of expensive damages having been done to wiring installations by unknown persons, the Master Electricians Association of Westchester County (N. Y.), Inc., offers a $100 reward for the "information leading to the arrest and conviction of any person damaging the electrical wiring and equipment, with malicious intent, while

HEAVY MODERNIZATION JOBS: Since Herbert G. Martin began the firm of Herbert G. Martin, Inc., at Yonkers, N. Y., in June, 1934, some interesting power jobs have come his way. An investigation conducted for the world's largest paper corrugating plant nearby, led to a $30,000 motor re-wiring job. Other projects include the wiring for large steam to electric drive conversions in Sing Sing prison, and a similar power conversion job of over $15,000 for the Yonkers municipal pumping station. Mr. Martin went into business for himself after a local contracting organization with which he had been associated was liquidated.

SHAWMUT SHUR-LAG
RENEWABLE FUSES

★ Ferrule Type permit speedy renewal . . . plenty of room to insert link in fuse case . . . Ferrules have deep screw driver slots.

★ Shawmut Shur-Lag Renewable Fuses are sturdily built and provide greater time lag under unusual overload conditions.

★ Links are of uniform thickness . . . can be inserted from either end of fuse case.

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★ Knife Blade Type have no small parts to become lost or mislaid in refilling . . . simple and efficient in design.

★ Permanent rigid blade alignment . Blades are assembled to an extra heavy insulating crossbar.

★ Can be assembled ONLY one way . . . the correct way.

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Fuse Specialists Since 1893

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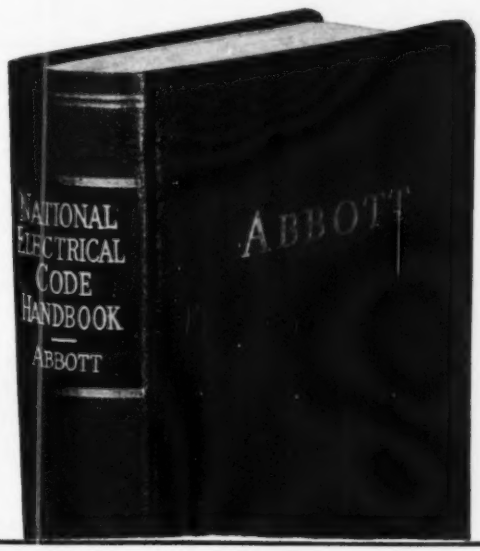
Simplifies and explains the NATIONAL ELECTRICAL CODE



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—simplified application of Code data pertaining to motor installations

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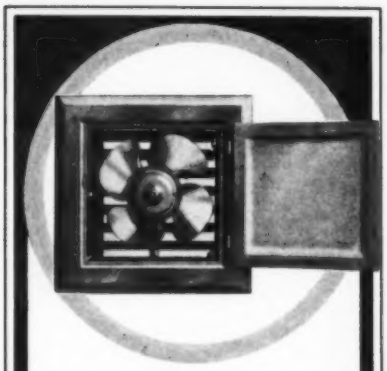

Full Automatic Wall Box Kitchen Ventilator Fan

Built-in type for permanent installation, it is telescopic in design, adjustable to wall thickness 7" to 13". No wood or metal frame or screws in the plaster, wood, or brick necessary. Inside and outside polished cast aluminum; wall box rust resisting steel. Quickly installed in old or new homes. Automatic switch and shutters controlled by opening and closing of the door. 10" silent blade fan; available for A.C. or D.C.; A.C. non-radio interfering. Write for bulletin and prices.

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Menominee, Michigan, U. S. A.

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in the course of construction." The association members are provided with reward labels for display on their jobs. These labels are printed in red ink on 4-in. by 7-in. gummed paper, and have spaces at the bottom for inserting the contractor's name and address.

New Officers Elected

Kansas City (Mo.) Chapter, N.E.C.A.—G. V. Dameron, president; B. R. Nelson, vice-president; Carl Johnson, secretary; E. L. Fickie, treasurer, and G. G. Burkholder, J. F. Costelow, Fred E. Geiss, John McKay and W. T. McAuley, directors.

Detroit (Mich.) Steinmetz Electrical Contractors Club—Jack Levitsky, president; Dan Zalesin, vice-president; Charles Capp, recording secretary; Wm. Hoffman, financial secretary, and Joe Simon, treasurer.

Minneapolis Electrical Contractors Association—F. M. Tripp, president; L. T. Prall, vice-president; E. B. Kelly, secretary-treasurer. F. T. Langford, H. E. Wedding, A. S. Velie and Earl Williams, board of directors.

Carton Label for Approved Material

Underwriters' Laboratories announce a new marker for cartons indicating that the goods contained therein are approved products.

Announcement is also made of a new standard for approval of dead front switchboards effective January 2.

League's Protest Secures Added Inspection for Denver

Vigorous resolutions addressed by the Electrical League of Colorado to Denver's mayor resulted in a new electrical inspector being budgeted for 1936 in the city electrician's department. The resolutions pointed out that revenues in this department overflowed into the municipal general fund instead of being applied to proper inspection and reinspection of wiring systems in public and private buildings.

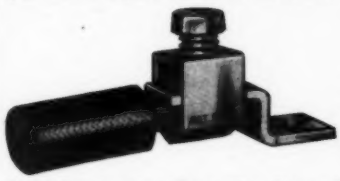
Porcelain Group Develops Non-Metallic System

The first porcelain outlet boxes with knockouts as a part of the all-nonmetallic wiring system being developed by the Standard Electrical Porcelain Manufacturers were announced in January. The association reports that members will soon be able to furnish all-porcelain outlet boxes and covers, flush switch and receptacle boxes in 1, 2 and 3-gang capacity, and a fuse entrance switch assembly in which the cabinet and switch base itself are in

NOTHING GRIPS LIKE A

ILSCO SOLDERLESS LUG

Just insert the wire, tighten the screw, and the wire is forced into permanent, solid contact—all in a few seconds time. It's the *triangular* wedge formed by the tang and V-bottom collar, that *grips* wires, (solid or stranded) with the tenacity of a bulldog. Yet wires are not flattened or separated; no set screw contact to cut or shear them. No special tools required to make the connection! Learn more about the *Approved* ILSCO SOLDERLESS LUG. Send for literature, prices, and samples.



Ilsco solder lugs show the size of the largest wire they will take.

ORDER FROM YOUR JOBBER

Ilsco Copper Tube & Products, Inc.
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The Badger
50 Amp.
SYNCHRONOUS TIME SWITCH

A thoroughly reliable, high quality time switch that will give many years of dependable service.

The result of over 26 years of exclusive time switch manufacture, this product offers the latest in design and construction.

Approved by the Underwriters' Laboratories and fully guaranteed by the manufacturer.

See your wholesaler or write for complete descriptive literature.

RELIANCE AUTOMATIC LIGHTING CO.
1937 Mead St. Racine, Wis.

one unit with no metal exposed to accidental contact.

The original all-porcelain outlet boxes were used by the University of Wisconsin last fall in its experimental farm wiring job. Since that time improvements have been made, including knockouts.

Rewire America Committee Formed

NEMA announces the appointment of the following as members of a committee to study the market possibilities of rewiring America, and to suggest ways and means of developing this market:

J. A. Wahlgren, Habirshaw Cable and Wire Corporation, chairman; A. F. Hills, Crouse-Hinds Company; Harvey Hubbell, Harvey Hubbell, Inc.; L. W. Mercer, Square D Company; D. Hayes Murphy, Wiremold Company; Fred Parnell, Merchandise Division, General Electric Company, and H. E. Seim, Bryant Electric Company.

It is planned to hold the first meeting of this committee during the first week in February when NEMA is holding its winter meeting in New York.

Rural Line Standards

A suggested set of simplified specifications for rural line construction is announced by the Rural Electrification Administration. Expensive construction features have been eliminated, but the National Electrical Safety Code has been followed throughout.

It is stated that the specifications just issued, while covering the most common type of construction readily adaptable to rural service, are not to be regarded as mandatory standards, but rather as representative types of the latest development in progressive rural line practice.

Massachusetts Contractors Oppose Concentric Cable

The specification by certain power companies of concentric cable for range wiring was condemned by the Massachusetts State Association of Master Electricians at its regular monthly meeting on January 2, and action was taken to bring this point of view to the attention of the Eastern Chapter, International Association of Electrical Inspectors.

The Massachusetts State Association has been very active in recent months campaigning against unfair trade practices on the part of suppliers. It is opposing direct-selling practices by manufacturers, unfair price cutting by retailers, discounts by wholesalers to employees of industrials and other large customers, and unsatisfactory differentials.

★

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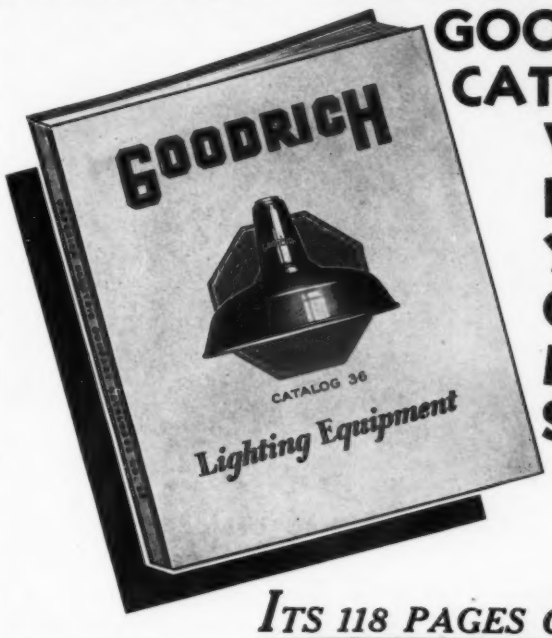
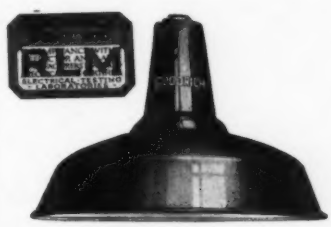


ITS 118 PAGES CONTAIN COMPLETE DATA AND PRICES ON PRACTICALLY ALL INDUSTRIAL AND COMMERCIAL LIGHTING EQUIPMENT AS WELL AS SCORES OF GOODRICH SPECIALTIES



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The RLM dome is only one of 1400 items listed in Catalog No. 36, which is yours for the asking.

• Each page is of business-getting value to *you*, giving *you* an immediate reference for any lighting sales problem. Keep this handy and convenient catalog and be prepared to make the right recommendation at all times. Send for it now so that it may begin to work for you on a profit-building basis.

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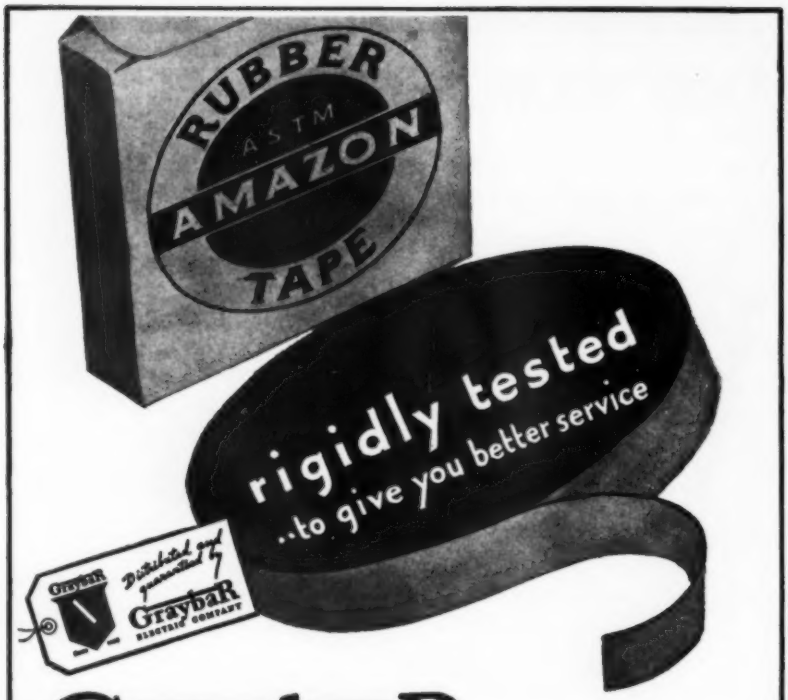

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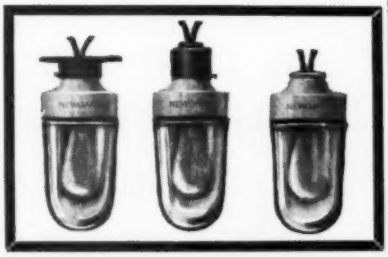
The Best and Safest Method is a properly installed KNOB and TUBE job. Be sure and get the

TRADE MARK Bull Dog REGISTERED

Assembled Knob because it "HAS A GRIP LIKE ITS NAMESAKE."

ILLINOIS ELECTRIC PORCELAIN CO.
MACOMB, ILLINOIS

MULTI
WEATHERPROOF
RECEPTACLES



Vapor and Weatherproof Lamp receptacles that effectively seal the metal parts and lamp against moisture or corroding gases. Made in styles for open wire, for suspension from conduit or on outlet boxes and in sizes for lamps to 60 watts and to 150 watts. A thoroughly satisfactory fixture approved by Underwriters.

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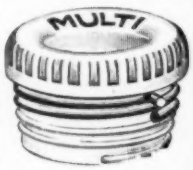

The most practical and approved means for protecting conductors when passing through metal. Multi Bushings are made in several styles to suit all requirements. Will lock securely in place and cannot be loosened by vibration. Be sure to install Multi Bushings for all around satisfaction.

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MULTI ELECTRICAL MFG. CO.
1840 W. 14th St. CHICAGO

A Roll o' Tape

Electrical Flashes gathered among the big wire and pipe men

by
Electrical Contracting's Field Editors

WHEN steel obstructions required the making of many extra conduit bends and offsets, which would also cause hard wire pulling later on, the Linquest Electric Company of Jamestown, N. Y., provided their local high school crew with an acetylene hole-burning outfit. Holes were cut at the rate of 5 min. each, therefore the investment was found to have proven itself decidedly profitable.

NEW names are needed for residence wiring conveniences, in the opinion of G. W. Perry, the sales-minded head of Perry Electric Co., Hartford, Conn. The public buys functions and conveniences, and not receptacles, single-pole switches, or the most mis-named outlet —3-way switches. Building up a home from 35 to 135 outlets recently resulted from selling on that basis, reports Mr. Perry.

MEANEST of miserly men, says Harry Abercrombie of Bridgeport, Conn., is one who wanted several sign reflectors installed at the top of his building in mid-winter from a "bos'n" chair—the owner to furnish all materials. As president of the Connecticut Electrical Contractors Association, he resented this invitation more than he might have otherwise—so his comeback was "Break your own neck, they're your reflectors."

CHANGING from straight contracting to domestic merchandising several years ago is reported to have played a part in an increase of about 35 per cent in wiring business for 1935 over 1934, reports Ralph J. Vaughn of Clapp-Rose & Vaughn, Inc., of Water-

bury, Conn. The sale of eighty-one oil burners and one hundred and fifty or more refrigerators brought in wiring jobs, many of which included other needed outlets in the home besides. Mr. Vaughn now contemplates further specialization in heating, to augment the regular line of industrial and commercial contracting business.

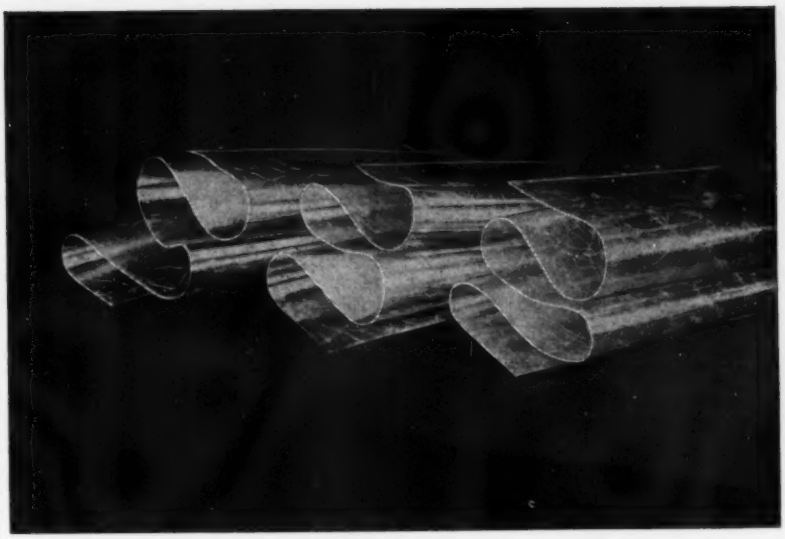
NEW developments in the field of motor re-winding products may seem to meet slow acceptance among motor service shop operators, says Charles H. Leppert, Hartford, Conn. But when such new products fail to withstand severe usage and motor failures occur, the reputation of the motor man is at stake, regardless of whatever adjustments or allowances the manufacturer may make.

WINDOWS talk the industrial experts' language at the offices of Austin & Moore, Inc., Long Island City, N. Y. Several large posters, neatly lettered, tell the story of: "The right control for your apparatus—Saftey, Production and Profits"; "Are you using the right motors?"; "Industrial Control"; "Measured performance will help you control costs." Each poster includes statements that refer to industry operations and tie in with selected apparatus and instruments on display.

LUDICROUS examples of inexperienced estimating crop up frequently in these days of frenzied below-cost competition, according to Ray Werme, Norwalk (Conn.) Electrical Co. A $600 gas station job, including all materials, recently went for about $400. Shortly afterward an identical job for which the materials were being furnished by the oil company was bid by the same cheap bidder at about $600. Maybe he got his bids reversed.

BUSINESS is good with the Electrical Maintenance Service Co., Inc., Bridgeport, Conn., according to W. M. Burr, president. Right now a two-story and basement brick annex is being built in the back. This expansion will provide more service shop space at the rear, and allow for the proper display of a heavy stock in drives, industrial controls, motors and accessories up front.

IT'S a long way from Montana to New Haven, Conn., where C. C. Ingram of Schulz & Ingram, Inc., holds forth. After graduating from the University of Montana, Mr. Ingram was engaged in several electrical positions, and finally selected New Haven as a promising place to apply his engineering training to the motor service shop business. Today this company has its



flexible **MICABOND**

Let us send you a sample of it. You really have to see this flexible Micabond—and feel it—to fully appreciate its remarkable flexibility—and its lack of tackiness. A postcard will bring a sample. Write today!

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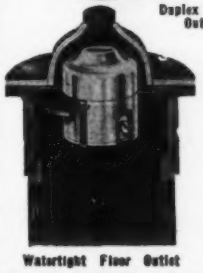

Watertight Floor Outlet

Build up prestige and good will by installing quality materials in all your jobs.

STEEL CITY PRODUCTS

help the electrical contractor gain a reputation, not only for furnishing quality products but workmanship as well, because they are manufactured in accordance with the workman's needs, insuring speedy, dependable performance at all times.

We manufacture a complete line of outlet boxes, covers, switch boxes, conduit fittings and electrical specialties, furnished in sherardized, galvanized, enameled or cadmium finish.

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Gentlemen:

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QUAD
LIGHTING UNITS
ANNOUNCES
A NEW
PRACTICAL AND
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POST-TOP
REFLECTOR
for
Service Stations
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Outdoor Lighting

Suitable for use with the new High Tensity Mercury Vapor Lamp. Necessary reactor or transformer can be mounted in base of standard.

City parks and playgrounds, suburban street-lighting and gasoline service stations are among the principal prospects for this new type of lighting.

The unit consists of a porcelain enameled reflector attached to an urn shaped cast aluminum socket housing by means of heavy cadmium plated iron rods. The cast housing fits over two inch pipe and is secured by set screws.

Green porcelain enamel, white inside, is standard finish but reflectors will be furnished in red, blue and other colors on special order. Three sizes of reflectors 18", 20" and 24" to accommodate lamps from 200 watt to 1500 watt capacity.

Standard package is one complete unit in a shipping carton.

Write for additional information, prices and light distribution chart.

QUADRANGLE MFG. CO.
30 South Peoria Street
CHICAGO, ILL.

own modern plant with space reserved for building on when increased business so requires.

RESIDENCE wiring layouts grow under the sales effort of Ray Werme, Norwalk (Conn.) Electrical Co. Ray has just completed a $385 job which began at $140. Upon its completion, the owner had some cove lighting, lights in all closets, an annunciator system, and a sensible number of correctly spaced switch and receptacle outlets.

THERE is nothing more explanatory of a good industrial lighting job than "before and after" photographs of such installations as are displayed in the office of the Haselton Electric Co., Hartford, Conn.

PROOF that a customer has been treated satisfactorily comes when a newly re-wired plant burns down and the same contractor does it over completely once more. Such was the recent experience of N. E. Furst, Furst Electric Co., of Long Island City, N. Y., who not only re-wired 700 hp. in motors, but also re-wound twenty of them, ranging from 3 to 150 hp.

AMONG electrical contractors who are also radio technicians, may be listed Richard C. Keeton of Bridgeport, Conn. The elimination of radio receiver interference brings in jobs which are removed from the beaten paths of competition. When larger motors are involved, this work amounts to $20 or more per job.

A CONTACT mat placed at the front door operates a chime display stand in the C. J. Olson store at Newburgh, N. Y. This not only provides a pleasing signal when a customer enters, but also arouses interest in the chimes, and in burglar protective devices.

ANOTHER lady estimator. This time it is Elizabeth Lane of the Downes-Smith Co., Stamford, Conn. Mrs. Lane has been at it eighteen years, and was just completing an estimate for a complicated industrial laboratory job when interviewed. Her spare time is devoted to purchasing and bookkeeping, as office manager of this prominent organization.

A SIGN in the office of the Electric Service Repair Co., Paterson, N. J., reads "We do not sell magnet wire or insulation." E. H. Bishop contends that his company's complete stock is maintained for rendering speedy repair service, and that it costs too much in time to measure out small dribbles of such material for tinkerers and handymen.

MONEY
FOR IDEAS!

A LONG established electrical manufacturing concern of spotless reputation and integrity seeks ideas to enlarge its line. Any appliance, device or fitting which can be marketed through the electrical wholesaler; something new or merely an improvement.

PATENTS will be financed for the inventor, if the idea is patentable. Substantial royalty will be paid whether the idea is patentable or not as long as it is original and acceptable.

WRITE in detail. This advertisement is legal assurance against your idea being used without recompense to you as above stated.

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Cable or Conduit Hanger
Jiffy Clip
Now furnished in EVERDUR as well as Cadmium Plated Steel.

Cable or Conduit Hanger
Rigid Conduit—⅜"—2½"
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Jiffy Clip—Rigid Conduit
⅛"—1¼". Also B X Cable

Ask your Jobber

MINERALLAC ELECTRIC CO.
25 No. Peoria Street, Chicago, Ill.

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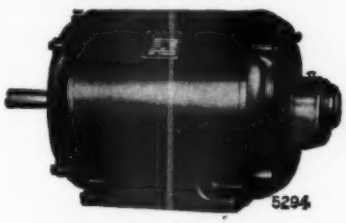
New Products . for February . .

Smooth-Start Motor

A single-phase motor, type S.R., that is recommended for applications where heavy sustained starting loads must be steadily and smoothly brought to speed. It is said to provide the efficient starting features of a repulsion motor and the approximately constant-



speed operations of an induction motor. The armature has both a squirrel-cage winding and a repulsion or commuted winding. Both windings operate as such at all times; the commutator not being short-circuited as the motor attains speed, and the squirrel cage winding not being opened at slow or starting speeds. Available at 1725 r.p.m. in 1, 1½, 2 and 3-hp. Recommended for such applications as air compressors, commercial refrigerators, pumps and other heavy-starting equipment. The Emerson Electric Mfg. Co., St. Louis, Mo.

Metal-Clad Switchgear

A line of metal-clad switchgear (Type MI-9) for light-duty service such as industrial plants, office buildings, and other applications, employing FK-42 oil circuit breakers. Manually or electrically operated breakers are available for this line in two ratings: 600-amp., 5,000-V. and 800-amp. 2,500-V., both with an interrupting rating of 25,000 K.V.A. Ease of installation, economy, safety to attendants, and reliability and continuity of service are

said to be advantages of such switchgear. Each unit includes an oil-blast circuit breaker, instrument transformers, disconnecting devices, supporting structure, interlocking equipment, self-contained elevating mechanism with a removable lever, bus, and interconnections. The breaker and its operating mechanism are removable from the housing. General Electric Co., Schenectady, N. Y.

Small Connectors

Smaller sizes of "Marr" solderless connectors which are said to take up less room than previous sizes. The smaller one (No. 00) holds two No. 16 wires or three No. 18 wires. The next size (No. 0) holds two No. 14 and two No. 18 wires; or four No. 16; or five No. 18 twisted; or seven No. 18 not twisted. Each box of 100 connectors includes a screw driver of the proper size to fit the particular connector. The Rattan Mfg. Co., New Haven, Conn.

High Bay Reflector

An industrial unit for high mounting applications, designed for use with 400-watt high intensity mercury vapor lamps, or with 750 to 1,500-watt in-

candescent lamps. The No. 1590 "Hi-Bay" X-Ray unit utilizes a silver mirrored reflector of 21½-in. diameter, which is said to provide high intensity illumination on both horizontal and vertical surfaces with perfect light control on the working plane. The reflector is encased in a ventilated, natural finished aluminum housing. A socket adjustment on threaded pipe provides light control for each interior. Curtis Lighting, Inc., Chicago, Ill.

Compact Switch-Circuit Breaker

The Colt-Noark "Protectit" is a compact combination control device which functions as a manually operable switch with automatic current overload protection. Enclosed in Coltrock casing, it is adapted for mounting on the cover plate of an outlet box or directly on a wall or on an appliance. The "Protectit" is designed for a.c. or d.c., up to 250 volts, and has a maximum rating of 1 hp. The operating mechanism of this device employs a bimetallic strip, serving as a mechanical latch, which connects the switching member and its movable contacts with the handle. Overheating of the strip by the passage of an electrical overload through it, causes it

to bend sufficiently to release the switching member, thereby breaking the circuit. It is claimed that the "Protectit," though entirely "handle free" also embodies automatic "handle return." Two types are available, type "BH" which makes use of interchangeable heater elements and type "B" which has a fixed ampere rating and cannot be changed. Nineteen differently rated heater elements, ranging from 1.3 amp. to 14.2 amp. are available for use with Type "BH." Ten Type "B" Protectits with fixed rating are listed ranging from 1.3 amp. to 15.0 amp. The casing is 3½ in. long, 1⅝ in. wide, and 1½ in. deep. Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.

Vibration Damper

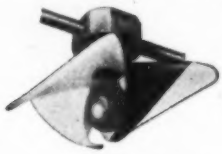
A line of equipment for the isolation of vibration caused from rotating machinery. Type T Seismo-Dampers are built in sizes from 100 lbs. to 2,500 lbs. capacity. Machines are directly supported with this type of unit by a T-iron, which is separated by natural cork or other isolating material from

two angle irons which form the base. Adjustments are provided for precompressing the isolating material to suit the machine load, either before or after installation. The Korfund Co., Long Island City, N. Y.

Aisle Reflectors

"Stack-Lights" are designed to provide uniform illumination of narrow aisles at low mounting height, as in stock bin aisles and library book stacks.

They are said to deliver a high intensity of light directly on the vertical surfaces of shelves while also protect-



ing against glare. Porcelain enameled reflectors are supplied with four styles of hoods: for conduit stem suspension; right angle hood for dead-end horizontal conduit; feed-through hoods for horizontal conduit runs; and direct outlet box mountings. Goodrich Electric Co., Chicago, Ill.

Case Lighting Unit

No. 888 Display Case Lites are recommended for open shelf displays

of merchandise as in liquor, drug and grocery stores. Pure sheet aluminum reflectors are used, the 9¼-in. diameter size being designed for 200-watt, and the 7-in. diameter size for 100-watt lamps. Each unit includes a polished aluminum cap, a chromium rod, and a red lacquered outlet box. S & M Lamp Co., Los Angeles, Calif.

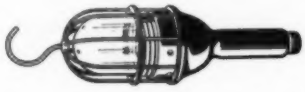
Circular Tube Light

A combination mercury vapor-incandescent lighting unit which combines in one reflector a circular 33-in. mercury vapor tube and a 200-watt incandescent lamp, totalling 500 watts load per unit. Proper spectral balance

is said to be thus provided to make this light suitable for industrial applications, such as for accurate color differentiation, for critical inspection, or other work which involves difficult visual problems. The blended characteristics of mercury-vapor and incandescent light are said to compare very closely to the values of red, green and blue light values of the afternoon sun. Line connections for this light are made in the same manner as for ordinary incandescent units, because the light also contains the auxiliary for operating the mercury tube. General Electric Vapor Lamp Co., Hoboken, N. J.

Vapor-Proof Lamp Guard

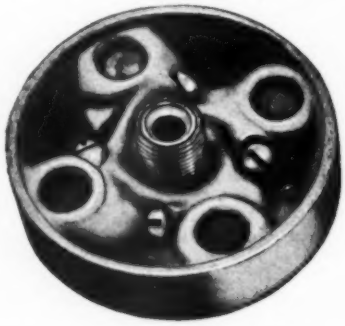
No. 3000 portable lamp guards embody gasketted vapor-proof construction, and



are said to be easily dis-assembled for changing lamps. A hard wood safety handle is provided with a knurled packing gland assembly and two sizes of rubber sleeves for accommodating different diameters of rubber cord. This is said to prevent any strain on the socket terminals and conductors. A threaded glass globe, designed for A-19 rough service 50-watt lamps, is guarded by a two-part steel wire cage. McGill Manufacturing Co., Valparaiso, Ind.

Fixture Outlet Box

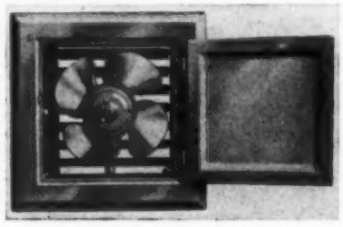
Type SP-5200 B fixture outlet boxes for use with armored cable are said to provide a simple and effective method



of grounding because of the firm mechanical and electrical connection which becomes established between the box and the armor. Quick installation and secure connections are featured claims. General Electric Co., Schenectady, N. Y.

Built-In Ventilator

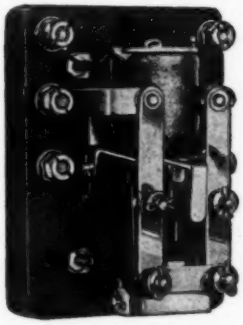
A kitchen ventilator for permanent installation in the walls of old or new homes, requiring neither wood or metal frame, or screws in the plaster, wood or brick. A telescopic adjustment fits walls of 7 in. to 13 in. thickness. The



10-in. blade fan is provided with a door that operates the motor and shutters simultaneously when it is opened or closed. Polished cast aluminum frames are used inside and outside, while the wall box is made of rust resisting steel. Available for a.c. or d.c., the a.c. type being equipped to reduce radio interference. Signal Electric Mfg. Co., Menominee, Mich.

Latch Type Relays

Mechanical latch, electrical reset relays in single and double throw types, employing two coils, one for closing and one for opening the relay. A metal latch holds the relay armature



closed without requiring continuous holding coil energy. This latch is tripped and allows the armature to drop out when the opening coil is energized. Momentary contact push buttons or other switches may be used for operating these relays. Auxiliary contacts can be provided which break the coil circuits a fraction of a second after operation. Available up to four poles, in ratings up to 30-amp., 110-V. and 25-amp., 220-V., a.c., and 6-amp. 110-V., and 4-amp. 220-V., d.c. Struthers Dunn, Inc., Philadelphia, Pa.

Ornamental Floodlight

A 250-watt floodlight for lighting small signs where appearance and effectiveness are important. It is of

weatherproof cast aluminum construction, and has a prismatic heat-resisting glass lens. High efficiency, convenient cleaning, and easy servicing are said to be combined with an inconspicuous yet attractive design. A variety of ornamental standards and brackets can be had for using these floodlights in service stations and similar applications. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Trade Notes . .

G.E. to Certify Radial Wiring Contractors

Contractors who submit satisfactory written answers to twenty-one questions will receive certificates qualifying them as "approved electrical contractors for General Electric radial wiring installations."

The radial wiring system which was designed by General Electric engineers for the "New American" homes was first described in detail in ELECTRICAL CONTRACTING, July, 1935. The General Electric Company, Merchandise Division, Bridgeport, Conn., has also made all of the information about the system available in a 17-page heavily illustrated booklet.

Edwards New Officers

Robert S. Edwards recently succeeded his father, the late Robert Edwards, as president of Edwards and Co., Inc., in a general moving up of executives. Other changes are announced as follows: Thomas Nolan, vice-president in charge of sales; Christian Miller, vice-president in charge of manufacturing; Edward P. McHugh, treasurer and member of the board of directors; Charles H. Holden, formerly manager of the Chicago office, now assistant sales manager at New York, and John L. Taylor, formerly in the New York metropolitan district, now manager of the midwest district with offices at Chicago. Mr. Edwards is this company's third president and a grandson of its founder.

Stanley & Patterson, Inc., New York, N. Y., announces that Frank V. Burton is now associated with James A. Vaughan in its Philadelphia, Pa., office.

Signal Electric Mfg. Co., Menominee, Mich., announces the appointment of Walter J. Goggin, 376 W. Water St., Syracuse, N. Y., as its New York state representative. Mr. Goggin will cover all of New York state, with the exception of New York City.

L. H. McClure has been promoted by the Colt's Patent Fire Arms Manufacturing Co. to sales manager for Colt-Noark products. Mr. McClure has been with the Colt company since 1918, having previously been employed by the Hartford Electric Light Co.

Cutler-Hammer, Inc., Milwaukee, Wis., announces the advancement of G. S. Crane, sales manager, and W. C. Stevens, chief engineer, to vice-presidencies in charge of sales and engineering respectively. Mr. Crane began his service in the company's engineering department more than 25 years ago, while Mr. Stevens started 30 years ago, also in the engineering department.

Trade . . . . . .

Literature . . .

Air Cooled Transformers: Bulletin No. 734 describes five different types of air-cooled (dry type) transformers and auto transformers, and has a winding diagram for each type. Sorgel Electric Co., Milwaukee, Wis.

Wires and Cables: A pocket size 48-page catalog devoted to the "U.S." line of insulated wire, cable, portable cords and cables, and tapes. United States Rubber Products, Inc., Wire Dept., New York, N. Y.

Lighting Equipment: "Permaflector Lighting," a 56-page pocket size catalog No. 37 covers window reflectors; spotlights; floodlights; theatre lighting equipment; commercial luminaires; floor lamps, and mounting accessories, Pittsburgh Reflector Co., Pittsburgh, Pa.

Industrial Thermometer: An illustrated folder describing applications for Ideal Tel-Temp, an instrument which indicates operating temperatures on motors, generators, busbars, pumps, bearings, and other machinery. Ideal Commutator Dresser Co., Sycamore, Ill.

Building Wire: A description of Firekrome Safecote wire in distinctive colors, for use in buildings. This includes grades of insulation, performance specifications, size-of-conduit tables, dimensions and weights. Booklet No. 125, 8 pages. Hazard Insulated Wire Works, Div. of the Okonite Co., Wilkes-Barre, Pa.

Fixtures for H. I. M. V. Lamps: A 28-page bulletin containing data on the high intensity mercury vapor lamp, how it operates, color composition, and its advantages for indoor and outdoor illumination, together with descriptions and illustrations of a line of glass-steel diffusers, porcelain enamel reflectors and aluminum units for various types of lighting conditions. Benjamin Elec. Mfg. Co., Des Plaines, Ill.

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Sales organization over 20 years' experience catering to jobbers, dealers electrical field having office and stock room facilities desire to represent exclusively manufacturers of standard lines. Correspondence also solicited with manufacturers whose present representation is not efficient. Box 23, Electrical Contracting, 330 West 42nd Street, New York, N. Y.

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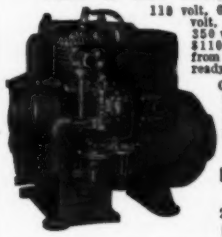

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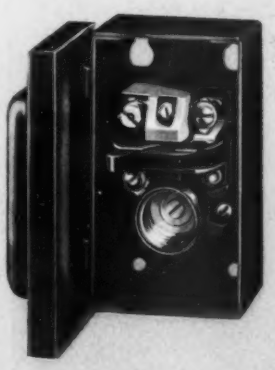
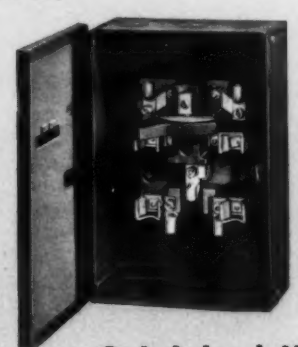
The Blue Label line is available in 30 and 60 amperes. 30 ampere for plug or cartridge fuses in 2-pole, 2 and 3-wire solid neutral. 60 ampere, in 3-wire solid neutral.

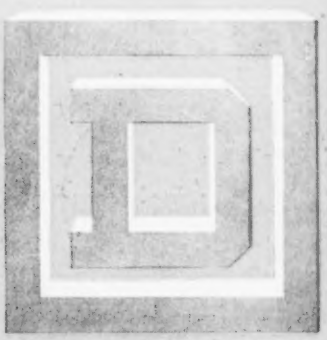
Contractors will find a ready market for this line for use with electric refrigerators, water heaters, oil burners and similar applications.



ACTUAL SIZE
This closed view shows actual size: 5⅜ inches high, 3⅛ inches wide and 2¾ inches deep.



■ Open views show interiors of both plug and cartridge fused types. Note positive pressure fuse clips.



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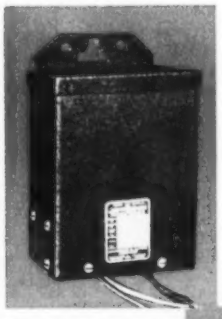

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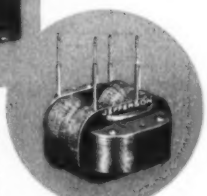

Core and Coil Type—which fits in fixture. Vacuumized, impregnated with final double varnish dip, baked. Cat. Nos. 232-301, 232-311, 232-321, 232-331.

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